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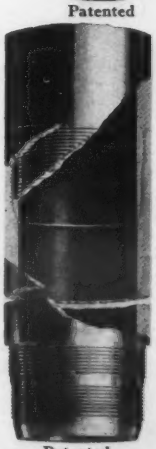

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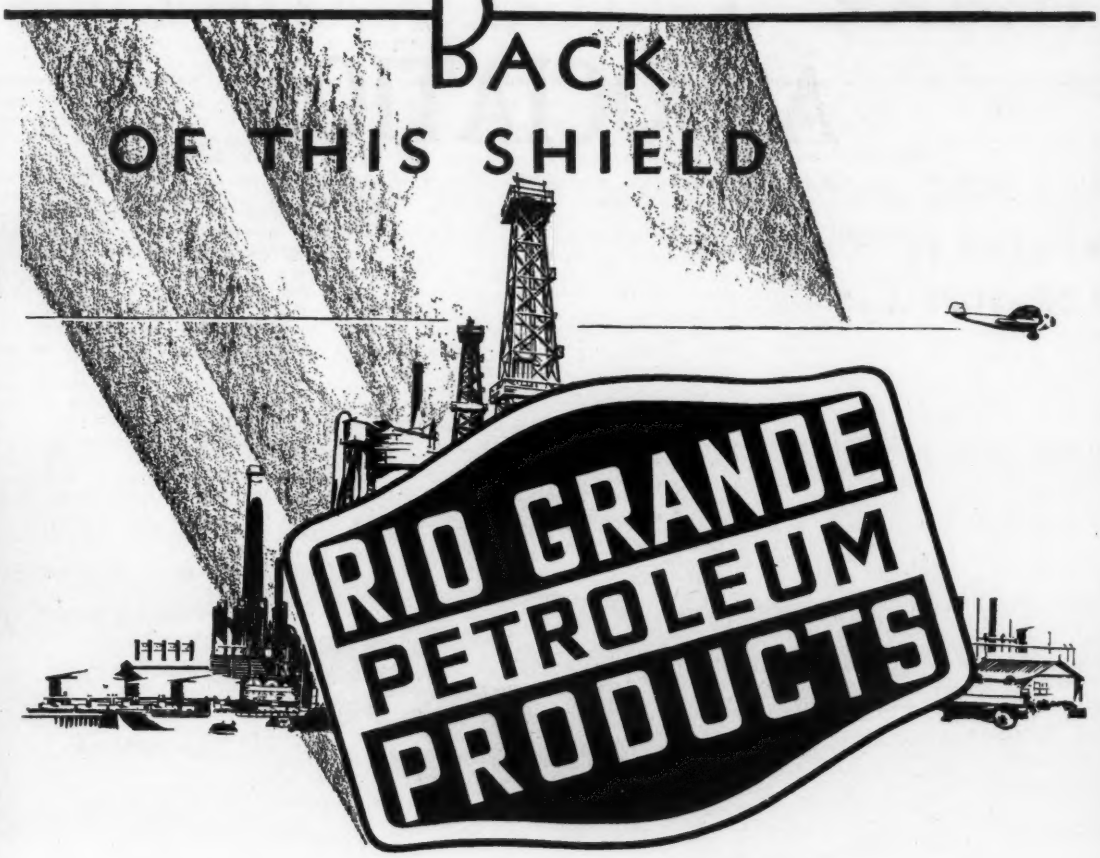
BACK
OF THIS SHIELD



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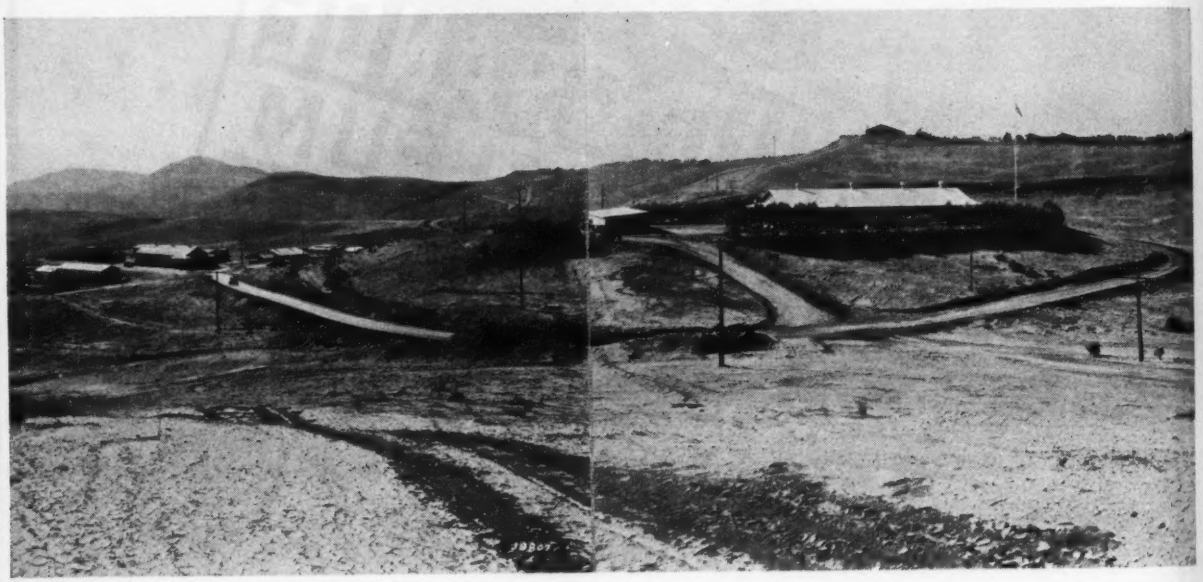
LOS ANGELES

R. G. O. 51

KETTLEMAN NORTH DOME ASSOCIATION



CALIFORNIA OIL WORLD

Vol. XXVII. No. 16 NOVEMBER 8, 1934 Whole No. 1368

Richfield Sale Seems Assured When Bid Presented To Court

Unless appeal from the court's ruling is taken, sale of Richfield Oil Co. of New York to Consolidated Oil Corp. for $4,400,000 is assured when the order is presented to the court by W. C. McDuffie, receiver in equity. Approval of the sale of the eastern unit was announced at the federal court hearing held Saturday after Harry F. Sinclair, chairman of Consolidated board of directors, raised his company's initial bid of $4,000,000, despite protests of Standard Oil Co. of California counsel against dismemberment of the company. Standard had urged that a public sale would be a fairer and more equitable disposition of the eastern unit if it were to be sold separately.

Mr. Sinclair likewise removed any doubt that his company was after the entire property, when he assured the court that Consolidated would offer an additional amount sufficient to equal Standard's bid of $23,500,000 for all of the Richfield assets exclusive of the unmortgaged assets of Pan American Petroleum Co. This turn of affairs merely confirmed early reports that Sinclair is determined to expand his present Pacific Coast holdings by purchase of Richfield assets or internal reorganization of the company.

The Saturday hearing developed these facts: that the sale of the eastern unit was approved by the court, as well as a large part of the claimants against the company; that the California Richfield's current financial position would greatly benefit thereby; and that Cities Service Co. by no means is out of the picture. From early discussions the Doherty group—which is heavily interested both as bond and stockholders—favored an internal reorganization of the Richfield company in preference to sale of its assets. Charles A. Fruehauff, counsel for Cities Service, testified Saturday that his company held an option from Consolidated Oil for a participating interest in the purchase of the New York company. He stated further that his company, if complications were to arise through the sale, would make a bid to the federal government of an amount equal to Standard's present offer of $525,000 for the unmortgaged assets of Pan American Petroleum Co.

Consolidated's $4,400,000 offer for the New York Richfield reacts beneficially on the California's company's financial outlook. Its current assets, according to estimates by financial experts, will be advanced to approximately $14,000,000 upon receipt of payment for the eastern subsidiary. This materially strengthens the company's financial position, and brightens the outlook for a maximum return to creditors and claimants who will be in a more independent position with respect to the disposal of the remaining properties.

Receiver McDuffie's statement that sale of the eastern unit at the earliest possible date was advisable as a means of avoiding further losses, together with Mr. Sinclair's assurance that Consolidated's bid for the California company would be sufficient to equalize Standard's bid, no doubt carried weight with the court. The eastern unit, which was purchased during the prosperity peak but was caught in the financial upheaval before the company had obtained a firm footing in the territory which it serves, played its part in Richfield's undoing, for it has been almost a continuous drain on the California company's resources. Mr. McDuffie pointed out that the chief difficulty it had encountered was in obtaining a sufficient supply of gasoline at a reasonable price, and that the present contract would expire April 1, and he was not certain it would be renewed. Initial cost of this unit has been variously estimated at from $10,000,000 to $12,000,000. The company's earning power has been handicapped by conditions over which it had no control. The Sinclair offer not only includes a cash payment of $4,000,000, but further agrees to reimburse the receiver for any advances made to the eastern company since June 30, last. This latter totals more than $360,000 and the receiver said an additional $100,000 would be necessary.

In view of these conditions, and the recommendations by a majority of interested parties, the court instructed the receiver to draw up an order for a sale of the New York Richfield based on the Consolidated offer. The court has stated that the order will be affirmed.

Both Consolidated and Cities Service offered to pay $525,000—the amount of Standard's bid—for the unmortgaged assets of Pan American Petroleum to prevent any legal complications with the government.

One of the major points raised during the Saturday hearing related to the government stipulation in respect to settlement of its claim against the properties growing out of the Elk Hills lease suit. Counsel for the trustees of the bonds requested that the sale must not be allowed to endanger the government stipulation by which a settlement of the claim has been agreed upon for approximately $5,000,000, plus a participation in any excess that may be obtained by a new offer greater than the Standard's $23,500,000.

Government counsel said that the government would consent to the sale only if the $5,000,000 plus be paid at the time of the sale, but objections to this were raised by counsel for the receiver and others interested and the court sustained these objections, after pointing out that there is nothing in the stipulation relating to any particular sale or how it should be made.

DRILLING SUMMARY

Oil field operations reported during the week ended Nov. 3, show 10 notices to drill new wells filed, as compared with 13 during the previous week. 1 was in Huntington Beach, 2 on the Mesa, and 7 in Kern county. Total new wells this year, 502, as compared with 524 at the same date last year.

Deepening or redrilling jobs numbered 11, as compared with 18. Total to date, 557; to same date last year, 684.

Abandonments numbered 4, as compared with 9. Total to date, 267; to same date last year, 295.

STATE DRILLING REPORT

	No.	S.	T.	R.
New Wells				
Huntington Beach				
Standard Oil Co.				
Huntington B	71	4	6 S	11 W
Santa Barbara Mesa				
Rio Grande Oil Co.				
Perkins	2	28	4 N	27 W
Rex C. Gale	1	28	4 N	27 W
Edison				
Monterey Exploration Co.				
Duff	7	15	30 S	28 E
Duff	8	15	30 S	29 E
Mountain View				
Union Oil Co.				
Kernco	4	15	30 S	28 E
Hogan Petroleum Co.				
Symons	1	4	31 S	29 E
Fruitvale				
Western Gulf Oil Co.				
KCL-B	15	22	29 S	27 E
Round Mountain				
Honolulu Oil Corp.	32 & 76	18	28 S	29 E
Deepen or Redrill				
Huntington Beach				
Macklin Oil Co.	1	10	6 S	11 W
Santa Fe Springs				
The Texas Co.				
Standlee	3	6	3 S	11 W
Associated Oil Co.				
Clarke	21	1	3 S	12 W
Long Beach				
Shell Oil Co.				
Cresson Comm.	3	19	4 S	12 W
Dabney-Johnston Oil Corp.	22	24	4 S	12 W
Richfield Oil Co.				
Heartwell	2	29	4 S	12 W
Inglewood				
Associated Oil Co.				
Vickers	50	7	2 S	14 W
Richfield				
C. C. M. O. Co.	2-BB	29	3 S	9 W
Elk Hills				
Standard Oil Co.				
Tupman	12	36	30 S	24 E
Kern River				
California Star Oil Co.	1-40	22	28 S	27 E
Mt. Poso				
Shell Oil Co.				
Vedder	6	9	27 S	28 E
Abandon				
Midway				
Union Oil Co.				
St. Helens	1	32	31 S	24 E
Mountain View				
Hogan Petroleum Co.				
Haley	1	29	30 S	29 E
Kings County				
Trico Oil & Gas Co.	1	33	24 S	22 E
Turner & Goldsberry	1	8	18 S	23 E

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« DEVELOPMENT NOTES »

Santa Barbara Well Blows Out, Makes 5000 Bbls. Before Sanding

By E. R. Head

Optimism has been running high at Santa Barbara among real estate men, property owners and lease hounds, since the spectacular blowout Sunday night of the Fair Acres Oil Co.'s Anchorgay well, Lot 47, Fair Acres Tract. The well blew in out of control, flowing through open casing at an estimated rate of 5000 bbls., then water broke in and the well sanded.

Conservative oil men see nothing about this well to get them excited. It is just another flash in the pan, so far as this shallow zone is concerned. Whether a deeper productive zone underlies this one, and what it will amount to is still debated, because few geologists and field engineers agree on the geology or the extent of the fault line which apparently divides the productive part of the field. On the basis of this upper zone there is little to promise more than a fair return on the investment for wells on top of the structure, and a rather dubious outlook for those on the flanks.

The Anchorgay well blew in while the crew was drilling out cement to test a water shutoff. Depth of the hole is reported at 2045 ft., with casing set at 1975 ft., which indicates approximately 50 ft. of oil sand, the average amount of penetration. Unfortunately for the owners, the blowout caught them completely unprepared, with no fittings on the well, no pipeline connections and no storage. Hence, most of the oil which sprayed the countryside was lost. However, workers on neighboring leases were in sufficient numbers to render assistance in diverting the stream of oil headed for the ocean and to dig sumps where it could be drained off and salvaged. The well sanded after a few hours' flow but the inrush of water which followed the tremendous head of oil makes the outlook for recompletion doubtful. If this proves the case, the loss will prove a serious one to the company, a Long Beach organization headed by W. L. Walker.

Abnormal rate of production in the Anchorgay well—due entirely to the hydrostatic pressure because of the shallow depth, and not to gas pressure—raised undue hopes at Santa Barbara. This conclusion is backed by facts, although it must be admitted that geologists have been badly muddled in their efforts to map the underground formations. It remained for two practical field men—experienced oil operators—"Bill" Rhoads and Fred Cole, to locate the prolific zone on the south side of what is believed to be a fault inclosure, but the extent or actual outline of which has not been determined.

Score of Wells Drilling

Early this week there were 21 wells listed as drillers and 31 producers on Santa Barbara Mesa. Of the drilling wells, 12 were below the 2000-ft. level, which means that they should be nearing completion. All of these are in the Fair Acres Tract which comprises 40 acres, with drilling at one well to less than an acre. It is considered unlikely that more than 25 acres of this tract will be included in the flush area. Wells drilled along the edges, or those just being started, will not fare so well as those on top of the structure.

All of the production thus far obtained has come from the Vaqueros horizon, only about 60 to 70 ft. of which is found productive and at a depth of from 1950 to 2100 ft. This not only accounts for the shallow finishing depth but for the short life of the flush production. There is relatively little gas in the sands, and this dissipates rapidly, cutting the wells to small pumpers sometimes within a few weeks, again, within a few days.

Previous to the Anchorgay blowout, the best producer in the field under control and during a continuous flow test of several days, has not averaged more than 2500 bbls. Gravity of the oil averages about 17 degrees A.P.I. and the crude brings 52c a barrel at the well. Drilling costs are low, raging from $10,000 to $15,000 per well, due to the shalllow depth. Since wells can be finished within two weeks' drilling time, this has made speculation in the field attractive from the outset.

Field experts and engineers who take the long range view are not optimistic concerning possible returns from such drilling, for they realize that the $15,000 per well maximum does not include or permit any reserve for hazards—such as befell the Anchoragy well. Their best estimate for recovery from the Vaqueros horizon is from 40,000 to 50,000 bbls. per acre for the productive area, with the average much lower. As in the Fair Acres Tract with one well to less than an acre, the average would be down to less than $25,000 out of which royalties and hazards must be deducted together with the drilling costs before net income can be reckoned. On this basis, it is not diffiicult to see why they predict the usual unhappy ending of most town-lot drilling ventures for a fair portion of the drilling in the field. There are practical operators in the field, however, who do not agree with predictions of the geologists, and it remains to be seen which group is right.

Rio Grande Perkins Lease

Thus far, the Fair Acres Tract has been the best portion of the gusher area of the field. Due east of it lies the Perkins tract of 50 acres, 10 acres under lease to Fred Cole and 40 acres to Rio Grande Oil Co., California subisidiary of Consolidated Oil Corp. Rio Grande's first well is down 1600 ft. and by the end of the week will cement the water string. No. 2 is rigging up and No. 3 is to be started very shortly. East of the lease lies the Knott lease of 40 acres on which Ortega Oil Co., headed by Jacques Vinmont, expects to start its first well within a few days. This well, if commercially productive, will prove up the east portion of Rio's lease. Wells on these two tracts will be drilled one well to five acres, which is the sane method of drilling any acreage, and particularly town-lot areas of such shallow depth.

Even at this conservative rate, Rio Grande officials hope for little more than to break even. The company has a number of field men in its employ with work slack for its operating division. By taking this block of acreage, officials figure that by careful field practice they can drill these Vaqueros wells for from $10,000 to $12,000 per well, and they believe even with the number of wells cut down, they will rate better on the average, and will pay out even in this shallow zone. Naturally, the prospects of a deeper zone make the play attractive, for the company has had plenty of experience both with the Vaqueros and Sespe horizons in its wells at Elwood, 12 miles farther to the west.

Frank Morgan, Rio Grande geologist credited with the discovery of Elwood, in commenting on the Santa Barbara Mesa prospects, said:

"The experience of town-lot fields has been that the actual profits come from the deep zones. Operators count on the upper zone for drilling costs, if they are lucky. The same appears true at Santa Barbara, for there is no assurance that the Sespe horizon underlies the entire productive area, or will be found productive if it does. There are too many 'ifs' tied in with the subsurface geology."

Only one well has been drilled to the Sespe—the Mann & Cates-Knott No. 2, located on the extreme west edge of the north end of the field—which was drilled to a depth of 4730 ft. This well was reported to have had about 1500 ft. of Sespe penetration but there was no oil sand—only shale. This well was south of Cliff Drive, close to the Hope ranch. The best portion of the field lies south of Cliff Drive.

While no one has ventured to make a deep test of the top structure, there is little doubt that such a test will be drilled as soon as the flush production from the upper Vaqueros zone slumps to a point where profits dwindle. Most of the drilling has been done by individual effort. Both the Rio Grande and Vinmont organizations are well financed, and with large blocks of acreage to test, some interesting results are anticipated. Meantime, the smaller operators will await the outcome of these tests.

Smith To Drill At L. B.

Ed. C. Smith of Long Beach expects to start immediately on a new well north of Hill and west of Rose, Signal Hill. A company will be incorporated later.

Stevens To Drill

Harlan Stevens, of Long Beach, will drill a new well just south of Jim O'Donnell's No. 71, south of State and west of Termino. He has not made public the names of his associates.

Signal Hill Well Planned

L. F. J. Bremner and B. C. Morrison will immediately start drilling on a lease just acquired at Signal Hill, east of Gaviota and north of Hill.

« DEVELOPMENT NOTES »

Bakersfield Refuses Superior Offer

Faith in the theory that the area south of Bakersfield city limits and Union Oil Co.'s Kernco lease will prove commercially productive has induced the City Council of Bakersfield to reject the offer of Superior Oil Co. of $125 an acre bonus for the 80-acre sewer farm tract. W. B. Morgan of Los Angeles offered to take the entire 160-acre tract at a cash price of $160,000, with a drilling clause in the lease to commence work on the first well within 60 days.

The cash bonus offer by Morgan undoubtedly was influenced by the fact that he already held a quarter section of the sewer farm under lease, and the additional 160 acres gives hm a solid block and eliminates the necessity of offset drilling to protect property lines. His holdings include the nw¼ of sec. 10 and the sw¼ of sec. 3, 30-28. General Petroleum holds a lease on the Hay property south of the sewer farm and Associated Oil has a quarter section of the C. Cohn Estate in the southeast quarter of sec. 10.

Shell Enters Edison

Shell Oil Co., which drilled the first well to obtain oil in Mountain View only to have it die on its hands, has moved over in to the Edison district. Shell has selected an undrilled sector for two tests —Osborne No. 1, which will be an offset to Edison Oil Co.'s C.C.M.O. producer; the other, Nichols No. 1, which will offset the Duff wells.

Old Producer Abandoned

Reliance Oil Co. at Huntington Beach has abandoned its No. 3, one of the earliest wells drilled in the old portion of the field. It was drilled on what then was known as Globe Petroleum's Encyclopedia lease.

Rex Oil Gets 75 Bbls.

Rex Oil Co.'s Mabry well, sec. 4, 28-27, on the Kern Front, has been brought in as a 75-bbl. producer from a depth of 2700 ft. This well is located one mile south of Ohio Oil Co.'s Premier No. 1 which opened the Premier area to the drill.

Shell Plugs Back

Shell Oil Co. has plugged and recemented its deep test, Taylor No. 77, in the Ventura Avenue field, back to 8730 ft. from an original depth of 9400 ft. Bottom water forced the company to plug off the lower portion of the hole.

Coyote Well Completed

Standard Oil Co. has added another 1200-bbl. producer in the Coyote Hills. Murphy-Coyote No. 116 has been finished at 6240 ft., one of the deepest producers in the field.

Lee Tests Edison Well

Interest in the Edison district this week swings to the southeast where Lee Oil Co. is making a formation test of its well in sec. 5, 30-29. This well has been drilled to a depth of 4020 ft. and is reported in oil sand with streaks of shale, and it looks like the most promising test of this area.

Sec. 5 has had an interesting history in the past. General Petroleum several years ago drilled two wells, one of them in the center of the section, obtaining small quantities of oil, but later quitclaimed the property. The Kerwin well was taken over by L. C. Osborne, and it still pumps an occasional 20 to 30 bbls. of oil a day. Fred Sayre, in the northeast quarter of sec. 5, drilled a well to 4222 ft. which obtained good showings of oil but failed to effect a water shutoff. Property owners on adjoining sections have waited patiently for some development in their favor, but field men are not optimistic concerning the outlook for holdings which swing to the northeast toward the hills because of the tendency to contact the schist or granite in such wells that have been drilled.

Bryant Well In Sand

With approximately 700 ft. of oil sand and shale reported by the company, field scouts are watching progress in Bryant No. 1, which recently was drilled to a depth of 4100 ft., a half mile west of the Torrance oil field, by Aron H. Hover.

Eight and five-eighths-inch casing was cemented at 3276 ft., giving this well sufficient formation to draw from. Gas showings have been strong.

Stevens Completes Well

Another 500-bbl. producer has been finished on the Glide lease, sec. 21, 27-28, where Dan Stevens just completed his No. 1 at a depth of 1965 ft. Stevens plans to drill four more on the same Glide lease, on the west side of the field.

Second Mesa Well Planned

Fair Mesa Oil Co. will drill a second well on its lease at Santa Barbara Mesa where it claims 450-bbl. production for its No. 1. Daniel Fisher of Santa Barbara is its active head. Ed. Gieck of Long Beach is one of his associates.

Bernstein-Mathis To Drill

Berstein-Mathis Oil Co., of which Abe Bernstein is president, will start a new well on lot 57, Fairacres, Santa Barbara Mesa, where the A & B Oil Co., of which Mr. Bernstein is also president, recently brought in a well estimated to have an initial production of 425 bbls.

Herndon Rig Up

Sam B. Herndon Oil Co. is preparing to drill a well at Mountain View where the rig is up. Further details of the location are not available.

Pure Running Casing

Reports from the Pure Oil Co. well in Madera county, at the Merced line and southwest of Chowchilla, say that some 8000 ft. of casing are being run, from which the inference is drawn in some quarters that a production test is contemplated. However, it may be that it is only to protect the hole while going still deeper. The company has moved its office to the well during the drilling and has closed the Los Angeles headquarters.

Three Locations Made

Drilling in Mountain View keeps pace with new completions. Three new sites have been staked off, one for General Petroleum's Brantley No. 4 in the sw¼ sec. 14, 30-28; another for Hancock Oil —Miller No. 2—in the same section; and a third for Union Oil Co. on its Kernco lease where No. 4 will be drilled in the se¼ sec. 15, 30-28. All of these wells are located in the northwest extension of the field.

Honolulu Erects Derrick

Honolulu Oil Corp. has completed derrick in sec. 18, 28-29, Round Mountain, for the first test of a community lease embracing five permits held by a group which has already submitted a plan of orderly development for the Oil Administrator's approval. Under this agreement, Honolulu will be in charge of the development and will distribute the royalties to the permit-holders on an acreage basis.

Sec. 18 already has ten producing wells yielding from 400 to 800 bbls. daily but this group does not come under the present agreement.

To Test Greenfield Area

Sea Cliff Oil Co.—L. W. Frankley and Joseph A. Spray, Los Angeles attorneys —will drill a wildcat in the Greenfield district 10 miles south of Bakersfield. J. W. Hackwith will be superintendent. The company has leased 820 acres. J. E. O'Donnell drilled to 4500 ft. without success within 1½ miles of this site. It is expected that the well will be drilled to great depths as a complete test.

Edison Well Planned

Surety Oil Co., which has production at Huntington Beach, will drill three-quarters of a mile northwest of the Lee well at Edison. The derrick is up. Floyd E. Clark is president, W. M. Killingsworth vice-president, M. T. Killingsworth secretary-treasurer and superintendent.

Buckeye Sets Casing

Buckeye Union Oil Co.'s New Hope No. 1, in the Premier district, has set casing for a water test after penetrating a shallow oil sand at 1150 ft., according to reports from the field. The well is about three miles west of Poso Creek.

XUM

CALIFORNIA OIL WORLD

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DAILY PRODUCTION

California Oil World Estimate

	Week Ended Nov. 3, 1934	Week Ended Oct. 27, 1934	Week Ended Nov. 4, 1933
Long Beach	53,000	54,000	54,500
Santa Fe Springs	35,750	35,000	44,000
Huntington Beach	34,300	39,800	50,700
Seal Beach	7,450	9,000	10,700
Inglewood	8,000	8,300	10,600
Torrance	7,000	7,200	6,450
Dominguez	18,500	18,000	19,500
Rosecrans	2,600	2,900	2,990
Del Rey	8,000	7,800	9,760
Lawndale	150	140	250
Potrero	350	370	350
Los Angeles Basin Totals	**175,100**	**182,510**	**200,800**
Ventura Avenue	23,500	23,350	34,600
Elwood	9,200	9,950	12,600
Rincon	1,500	1,650	1,400
Kettleman Hills	60,000	63,000	60,700
Belridge	7,200	6,700	10,300
Midway-Maricopa	50,600	53,600	48,900
Rest of State	117,000	122,300	92,000
State Totals	**443,400**	**463,060**	**470,300**

California Invites You

GENTLEMEN of the American Petroleum Institute, California invites you to meet in 1935 in Los Angeles, the oil center of the Pacific Coast. In this invitation extended you by the California oil industry; its many units, corporate or individual; the city and state; the civic and commercial bodies, the California Oil World heartily joins.

We assure you of the greatest welcome you have yet received. We shall endeavor to entertain you to the best of our ability, and in this work we shall be aided by our climate, our splendid roads, our beautiful scenery, and by the opportunity you will have to visit the California International Pacific Exposition at San Diego.

However, we understand and appreciate the fact that your convention is primarily a business meeting, to which pleasure is only incidental. We assure you that there is no place to be found where the conditions are better suited for such a gathering. Here you will find many of the foremost leaders in every branch of the oil industry, men who can talk the language of each specialty, who will help in all the problems you have to solve. Here you will find the latest equipment and many remarkable discoveries and improvements already perfected or in process of finishing. We will see that you have the best of quarters for your meetings and that you will not be bothered or distracted during your hours of work.

Despite the last five years of "depression," California has advanced since you were here in 1926. Since then we have brought in twelve new oil fields and three big dry gas fields.

Our greatest achievement in the field since 1926 has been the discovery, in 1928, and development of Kettleman North Dome. When Sir Henri Deterding came to California, saw this mighty structure and contemplated its vast potentialities he said, "It makes me silent." All of you have heard about this wonderful field, many of you may have seen it but unless you have seen it quite recently you will be astonished at the progress of its development and the extension of its producing area. It is fulfilling its promises and when you contemplate the mighty wells that are completed and held back you will see whence comes California's huge reserves which are being held and not wasted nor dumped on the market. Kettleman North Dome development has brought about the greatest extension of natural gas distribution and utilization despite the fact that pipe lines were barely completed when the business break came.

We have enlarged our refining capacity, built up our natural gasoline business, developed new products from gas and oil alike. We have conducted successful experiments in refining. We have built many hundreds of miles of pipe lines for moving both gas and oil. New tidewater terminals have been established.

But we will not undertake to tell you here a fraction of what has been done during the years that have elapsed since you met here. We will touch on the success we have had during the last few months in solving our marketing problems so that we have had no price wars for several months and prices are stable despite attempts of a few to "chisel."

Come to California next year. You will never regret it.

Tehama Well Down 1850

With bottom below 1850 ft., drilling operations are steady in the Pacific Petroleum Investment Corp.'s No. 1 wildcat being drilled for Wm. C. Warfield on a large block of acreage near Corning, Tehama county.

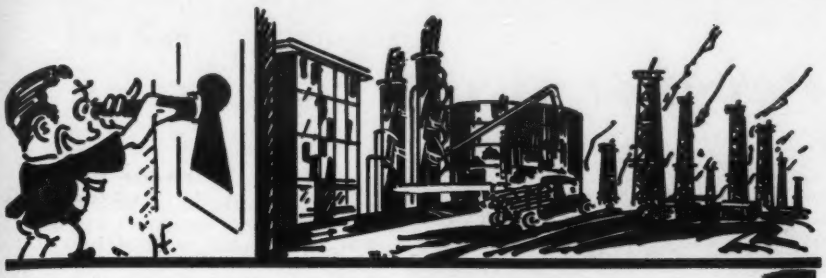
Oil showings were reported, along with considerable gas, at 1800 ft., the shale giving strong ether cuts.

Avenue Well Completed

Shell Oil Co. has completed its Taylor No. 82 in the upper Lloyd zone in Ventura Avenue with an initial rate of 2100 bbls. and an allotment of 1800 bbls. Depth of the well was 5550 ft. and a flow of 1,500,000 c.f. of wet gas accompanied the oil. One location from No. 82, Shell has just spudded in its No. 83, an inside location.

Murrieta Well Planned

Consolidated Petroleum Corp. of Long Beach, has taken a 40-acre tract in the Murrieta Springs district and plans to drill a test, according to C. P. Ritter, president of Olympic Refining, and an official of Consolidated Petroleum. Site for the test will be about half a mile from Matt No. 2 which the Albert Petroleum Corp. is drilling.



Believe it or not, Addie Olmsted of the C.C.M.O. has determined that one out of every three oil workers over forty years of age in the L. A. basin is working his son's way through college.

Be that as it may, however, local oil accountants were amazed to learn that Wesley Cunningham had been seen in Los Angeles a few days ago. The "travelling comptroller" was reported to be carrying a movie camera, so there may be some reel developments soon.

Scotty Connelly of the Standard, incidentally, tells us that the talkies are very popular over in the old country. Thousands of fans gather outside the theatres every night.

Bill Hay, the Union Oil Co. pipe line superintendent, has a den at home, but is nevertheless considerate enough of his family to go to the Club at Brea and do his growling with the rest of the Lions.

Bill is such an ardent supporter of U.S.C., that every time Howard Jones has a headache, he takes an aspirin tablet too.

"Mac" McLaughlin, former Deputy State Oil and Gas Supervisor, and now general manager for the Burnham Exploration Co., is out sporting a brand new Buick. By way of comment, we merely repeat the words of the immortal bard, "On with the dents. Let joy be unconfined."

Discussing a former employee, Wynn Lynch asked Bob Paul over at the G. P. Personnel Office, "Do you remember a guy with one eye by the name of Smith?" Replied Bob kinda pensively, "Can't say I do, Wynn. What was the name of his other eye?"

You know, personnel work is sure interesting. Here for instance, is a conversation that took place between Roy Benson, who sizes them up for the Standard, and a budding applicant:

Roy: "Where did you work last?"
B. A.: "In a nut and bolt factory."
Roy: "What did you do?"
B. A.: "Nuttin."

And of all the men he ever interviewed, "John D." Rockfellow of Union says that the fellow who had enjoyed the most colorful career was a bird who used to design labels for whiskey bottles.

Of course there is still money to be made in oil leases. You never know, according to Jerry Graham, when some golf club is going to want your land.

Also, says Dave Caldwell of the Barnsdall Co., when you see an oil man spading in his garden, you can tell at once, by the energy he displays, whether he is digging for worms or is merely gardening.

In this oil business, though, a man really needs a little relaxation once in a while, or the strain will eventually get him down. Earl Reese recalls the sad case of a conscientious production foreman who took his work so seriously that he finally caved in completely. The poor fellow was found one morning shaking the Christmas tree, and feeling around on the derrick floor for pine cones.

However, as Art Hendrickson remarks, the oil man's greatest hazards are on the golf course.

Speaking of eats, Jerry Rusk, of Gilmore, says if it is true that the bravest are the tenderest, the steer that supplied his beefsteak last night was a low down coward.

Hugh Shepard has forwarded a very sad story concerning the war experience of a certain oil man, who for obvious reasons shall be nameless. It seems that this chap had distinguished himself by some unusually brave action in the early days of the war, and was invalided home. The local paper in a story of the homecoming got a trifle mixed up, and referred to our hero as a "battle scared" veteran. This didn't go over very big with the boy's relatives, and they made a violent protest, whereupon the editor came out with a profuse apology, explaining that what he had really intended to say, was, "bottle scarred" veteran.

By way of a variation on one of our bewhiskered wisecracks, Charlie Wagner suggests: Oil men, roughly speaking, are roughly speaking.

And when the kids started practising football on his front yard, Crip Crippen very appropriately remarked, "It won't be lawn now."

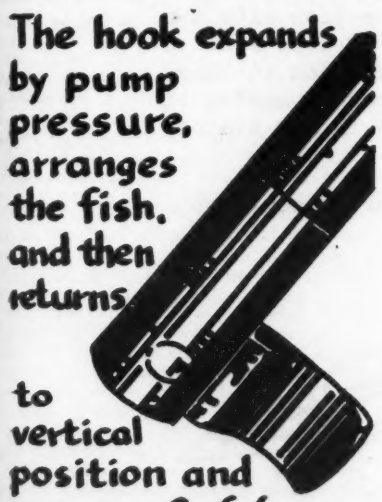
John MacQuiddy, the erstwhile big league ball player who now looks after the ships for Standard, explains that a vessel is always referred to as "she," because a ship isn't so easy to steer either.

John, we believe, is the author of that sad tale concerning the near sighted burglar who thought he was turning the knob on the safe, and could have been knocked over with a feather when the thing started to blare out a selection by Bing Crosby.

In conclusion, Ed Carter of Barnsdall, points out that the guy who kicks like a steer when his wife keeps him waiting five minutes for lunch, is the same bird who will sit on a wet rock all afternoon in order to catch a couple of under-nourished minnows.

And the ambitious college boy who said he would get a job in the oil business or know the reason why, didn't get the job, but he knows the reason why all right.

Doc Sutherland now contributes the interesting information that germs always work in groups, which explains very nicely to us laymen why we never hear of a measle.


The hook expands by pump pressure, arranges the fish, and then returns to vertical position and comes Safely out of the hole!
BAKER HYDRAULIC ROTARY WALL HOOK

FRANK L. SHAW
MAYOR

OFFICE OF THE MAYOR
CITY HALL
LOS ANGELES, CALIFORNIA

October 31, 1934

President and Delegates
American Petroleum Institute
In Convention Assembled
Dallas, Texas

Greetings:

As Mayor of Los Angeles, I wish to extend to you the most sincere invitation of our City to honor us with the convention of your association in 1935.

Los Angeles will look forward with anticipation to welcoming and entertaining you next year, should our city have the good fortune of receiving a favorable vote on this invitation.

The advantages of Los Angeles as a convention city are too well known to justify lengthy comment here, but I do want to assure you that if your next annual conclave is awarded to this city, we shall contribute every possible effort toward making it one of the most successful and outstanding events in the history of your organization.

With best wishes for the success of your present convention and kindest personal regards, I am

Very sincerely yours,

Frank L. Shaw

FLS:R MAYOR

You Can

Play In California

When Work Is Done

The California oil industry has invited the American Petroleum Institute to hold its 1935 convention in Los Angeles, and this issue of the California Oil World contains the expressions of invitation from many branches of the industry.

The delegates, if the meeting is held in California, will have the opportunity to study at first hand the many phases of the California oil industry that make it one of the leading, if not the most advanced proving ground for many of the industry's most valuable practices—but the delegates most certainly will not want to come to California and return to their homes without enjoying at least part of the state's great facilities for amusement and enjoyment. It is for the purpose of pointing out some of these features that this article is published in the California Oil World. Boosting California as a state is somewhat foreign to our purpose—but there are many reasons why the convention delegates should consider California as an ideal place to meet, one of the good reasons being that if offers an ideal winter playground after the convention is over.

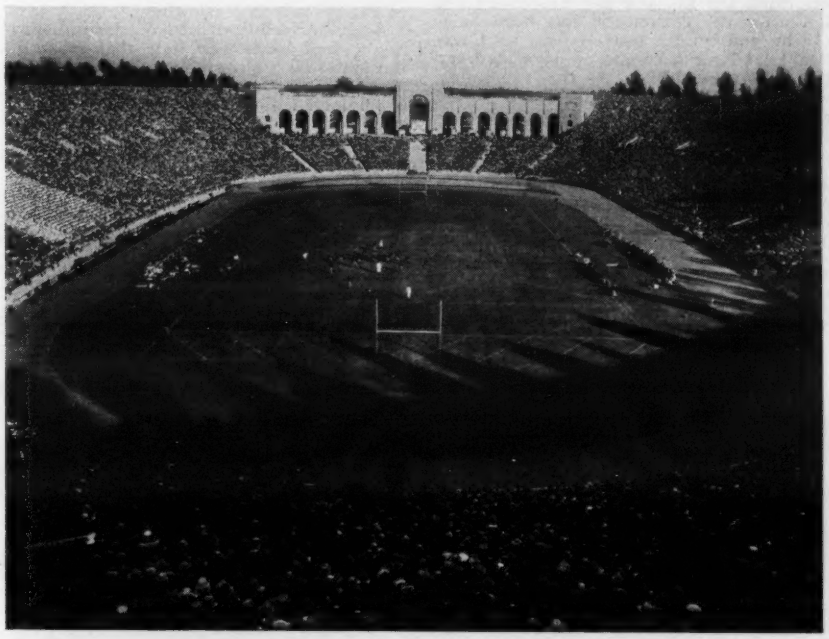
There is the all-important matter of climate. The climate, according to all loyal Californians, is either perfect—or unusual. We cannot go so far as to guarantee no rain or no cold, but we feel pretty safe in saying that Los Angeles will have no snow, sleet, nor blizzards while the convention is in session. If the rain does hold off, there are something like 60 golf courses which can be dug up by the irons of the visiting delegates. If any of them want to go swimming, there is the Pacific Ocean, not to mention a number of public and semi-public swimming pools. There is tennis, there are horses, there are football teams by the dozen—if the delegate's desire is to cheer someone else's efforts rather than exert some of his own.

There are mountains, and there is desert. The hiker can find all the trails he can possibly use, and the seeker after the sun can go to Palm Springs and bask in it until he is a burnished bronze over as much of his anatomy as he cares to expose.

We seriously question whether the delegate to the 1935 convention of the A. P. I. will want to play tennis, but if he does want to play a round of golf, or see a football game, or do any of the other things mentioned above, he will have all the facilities at his disposal.

If some of the delegates, after the day's business is done, want to see the sights of the city after dark, there will be plenty of sights to be seen. There are cafes, there are movies and motion picture palaces, with perhaps a gala premier opening of a super spectacle at Hollywood. There will be ice-hockey games, there is opera, there are legitimate theatres. There are dinner-dances, there are roadhouses and night clubs.

There are many worthwhile and interesting places to go—where things are being done. There are collections of interesting relics, books, art, prehistoric fos-



Los Angeles Memorial Coliseum where many of the outstanding sport events of the world have taken place.
—All-Year Club of Southern California photo.

Two hoary California palms silhouetted against the brilliance of a Hollywood "movie" premier.
—All-Year Club of Southern California photo.

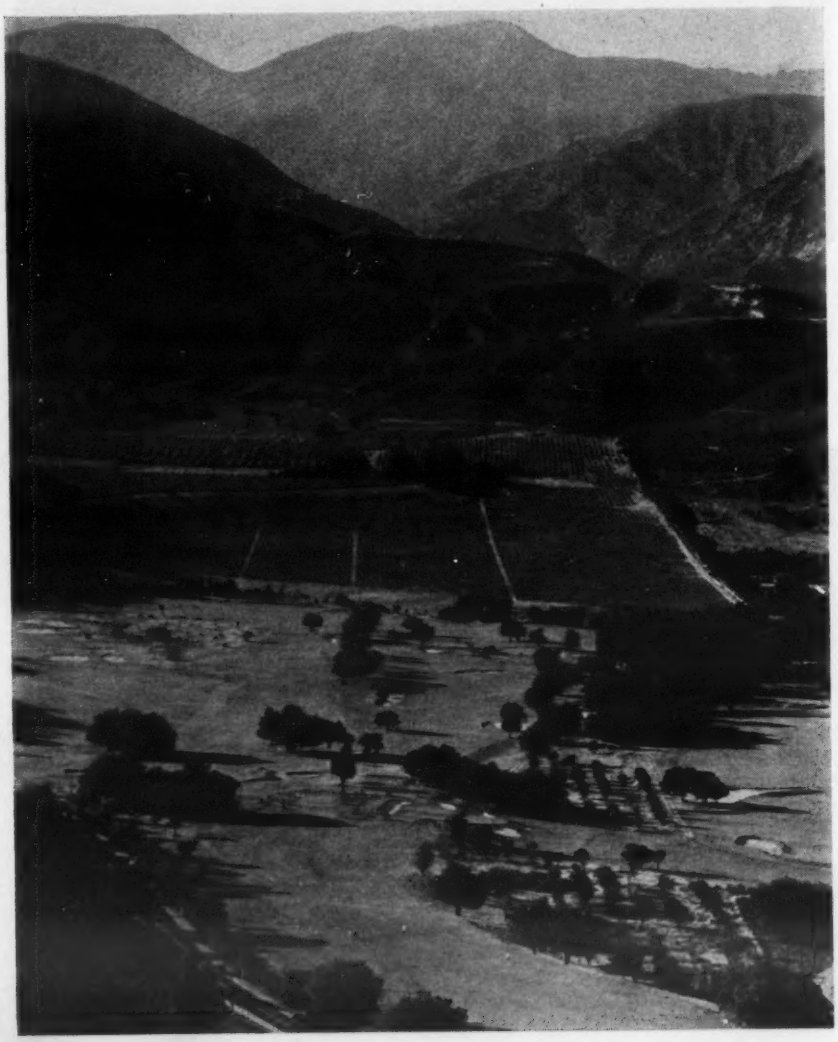
sils (for the geologists in attendance) and many other things.

There are automobile trips, of varying length, from those to the nearby beaches and foothills, to those to the high Sierras and the big trees. There are scenic drives from Los Angeles to San Francisco, if the delegate wants to visit the head office of the Standard Oil Co. of California, the Shell Oil Co. and the Associated Oil Co. after the convention has been held. Or he can go by boat—or go to Catalina Island for a couple of days, and try the deep sea fishing or the swimming which have made this off-shore resort famous.

This article has given but the briefest outline of some of the things that can be utilized during the spare moments of the convention and after it has been adjourned. It has pointed out some of the opportunities for play that abound in California, but it is to be remembered that the convention should be held here primarily because of California's place in the oil industry, and to give the convention assembled an opportunity to study and understand what it is that makes the California oil industry so postive about some of its theories, and what it is that makes most of those theories so much more successful than most of the theories of the oil industry elsewhere.

And the technical men of the industry might well learn why it is that most of the materials and practices they use every day have been developed in, or developed from developments in, the California industry.

California offers a nice blend of work and play. It ranks first insofar as men and materials of the industry are concerned, and it ranks first insofar as a vacation-land is concerned. The 1935 convention should be held here.



One of Southern California's many golf courses in a setting of majesty and grandeur.
—All-Year Club of Southern California photo.

U. S. Stocks Drop 1,035,000 Bbls.

Stocks of domestic and foreign crude Saturday, October 27, totaled 330,946,000 bbls., a decrease of 1,035,000 from 331,981,000 on hand the preceding Saturday. This decrease, which followed a decline of 837,000 bbls. during the previous week, comprised declines of 981,000 and 54,000 in stocks of domestic and foreign crude, respectively.

Current reports for the week ended Oct. 27, in comparison with those for the previous week, show daily average crude production declined 64,000 bbls., daily average imports increased 28,000, and the daily average withdrawal from stocks was 28,000 bbls. higher. Crude runs to stills for the week averaged about 2,465,000 bbls., a decline of about 30,000 from the previous week. The approximate daily average balance of crude oil during the week ended Oct. 27 was as follows (barrels): Production, 2,416,000; imports, 85,000; decrease in stocks, 148,000, equals runs to stills, 2,465,000; exports, losses, etc., 184,000.

CRUDE PETROLEUM STOCKS REPORTED BY COMPANIES HOLDING 100,000 BARRELS OR MORE

Grade of crude oil	Stocks held by reporting companies Oct. 20 1934	Oct. 27 1934	Change from Oct. 20 1934
	(Thousands of Barrels)		
Pennsylvania Grade	4,628	4,687	+ 59
Other Appalachian	1,165	1,159	— 6
Lima-N. E. Ind.-Mich.	1,432	1,449	+ 17
Illinois-S. W. Indiana	11,412	11,443	+ 31
N. Louisiana and Ark.	10,059	10,058	— 1
W. Tex. & S. E. New Mex.	30,067	29,639	— 428
East Texas	33,084	33,318	+ 234
Other Mid-Continent	157,091	156,147	— 944
Gulf Coast	18,304	18,015	— 289
Rocky Mountain	27,697	27,722	+ 25
California	34,209	34,530	+ 321
Total domestic crude	329,148	328,167	— 981
Foreign crude	2,833	2,779	— 54
Total crude	331,981	330,946	—1,035

Basin Chapter Of A. P. I. To Meet

W. H. Cree, Long Beach attorney, R. E. Donovan, safety engineer, and G. B. Moody, geologist, will address the Los Angeles Basin Chapter of the American Petroleum Institute at Shell Hall at the corner of Hill and Obispo Streets, Long Beach, next Tuesday, Nov. 13, at 1:30 p.m.

Mr. Cree has assisted in organizing and financing many independent oil operating companies besides being himself a successful operator. His advice on "Financing the Drilling of Oil Wells" will be valuable as well as interesting.

R. E. Donovan, safety engineer of the Standard Oil Co., will talk on "Interesting and Unusual Oil Field Accidents."

G. B. Moody is a specialist in the causes and results of earthquakes. He has taken an active part in the campaign of public education on this subject and is a popular non-technical speaker. His recent talk before the Taft chapter of the A.P.I. was highly praised. Slides will illustrate his talk.

The meeting will include the election of officers for the ensuing year and will be followed by refreshments.

THE California Oil and Gas Association extends a cordial invitation to the directors and members of the American Petroleum Institute to hold their Sixteenth Annual Meeting in Los Angeles in 1935.

LOS ANGELES

CORDIALLY INVITES THE AMERICAN PETROLEUM INSTITUTE

FOR 1935

BY TRAVELING TO SOUTHERN CALIFORNIA VIA ONE ROUTE AND RETURNING ANOTHER, IT IS POSSIBLE FOR MEMBERS AND FRIENDS OF THE INSTITUTE TO VIEW THE MAJOR PART OF THE UNITED STATES ENROUTE.

LOS ANGELES COUNTY OFFERS MUCH: GREAT OIL AND GAS INDUSTRIES, DELIGHTFUL CLIMATE, FAMOUS HOTELS AND RESTAURANTS, OLD MISSIONS, OCEAN BEACHES, ORANGE GROVES, MT. LOWE, SANTA CATALINA ISLAND, THE LOS ANGELES-LONG BEACH HARBOR, HOLLYWOOD, HUNTINGTON LIBRARY AND ART GALLERY.

THE ATTRACTIONS OF NEAR-BY CITIES AND THE WORLD'S FAIR AT SAN DIEGO ARE READILY REACHED BY VARIOUS MODES OF TRANSPORTATION.

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LOS ANGELES COUNTY BOARD OF SUPERVISORS

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Hon. Roger W. Jessup — Hon. Gordon L. McDonough

Hon. Frank L. Shaw, Mayor of Los Angeles

Mr. Harry L. Harper, President, L. A. County Chamber of Commerce

Compressor Station with 230 H. P. Overhead Exhaust Engines

MORE POWER
LESS LUBRICANTS
AIR COOLED EXHAUSTS
NO FLOOR TRENCHES
REDUCED CYLINDER WEAR

All of these important points are accomplished with CLARK'S new overhead exhaust cylinders

Reduced wear on the cylinder; because the bottom part of the cylinder on which the piston rides is the coolest part and keeps well lubricated. Also the exhaust ports and port bridges at the top of the cylinder can be more effectively water-cooled than when they are at the bottom where the exhaust foot obstructs water-cooling passages to some extent.

With the direct exhaust line, its shorter length insures most efficient scavenging. This efficient scavenging increases the maximum horsepower and also makes possible better operating conditions at all times, the normal operating temperature of the piston and the cylinder being lower.

"Your CLARK can be fitted with these new cylinders"

SMITH-BOOTH-USHER CO. Los Angeles Pacific Coast Distributors

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XUM

Our Present Attitude Toward Coring Devices

As Technology Advances We Change Our Opinions Of Electrical And Mechanical Coring, And Include The Oriented Core

By Stanley Herold

The fact is, as we all know, that many devices which aid in the drilling and completion of wells, or in repairing and maintaining them in the best physical condition for production, are freely discussed wherever geologists and engineers happen to meet or gather together, yet very little concerning these same devices appears in our current literature. Thus it is with many of the most important technical advancements of late years. Core sampling, side-wall sampling, electrical coring, water locating, cementing, gun perforating, bottom-hole pressures, surveys for pressures and temperatures during production, surveys for direction of hole, and directional drilling are among the operations now receiving remarkable consideration by those responsible for field development. Special instruments with convenient mounting on service trucks are required in most of them, and special methods of procedure have been determined carefully in each case. The development of both the instruments and the methods has been rapid in recent months. In some instances we can recall the original instruments and methods of a few years ago, and appreciate them as mere steps, crude as they were, toward the highly developed technique of today. And yet we still see further advances which are required along definite lines. Where we shall arrive in the next few years no one can say, but it seems we are on our way toward a state of relatively high perfection in developing a scientific course of action, in developing an industry which in the past has been considered limited by the lack of knowledge concerning events and conditions within producing wells and reservoirs.

While from the point of view of science the picture of the industry brightens speedily, the improved technology can not make all things right in the economics of the industry, for the latter is, as we know, a more comprehensive feature of production. But technology—that is, the proper technology with more of common sense and less of bunkum—can go a long way in the efficiency of our operations, and this efficiency in turn is a good foundation upon which to build a superstructure of economy.

Mechanical Coring

With respect to these modern devices and to the methods of their use it is often difficult to differentiate between those features which are strictly matters of geology, and those which are strictly matters of engineering. Indeed these two branches of technology seem to meet and intermingle considerably at this point of field operations. A closer relation between the departments of geology and engineering in the organization of our oil companies is being established as a consequence of this fact.

Perfections in the detail of design and in the selection of quality steel for the various parts of the tools have been effected as the result of experience. It is not in these changes, however, that the most important advancement has been made, but rather in the development of a better understanding, a better interpretation and a better application of the information obtained by the use of the tools. In several instances we now hold an entirely different attitude toward the device than we did in former times.

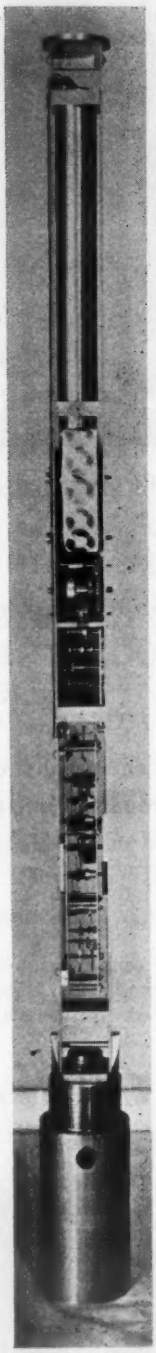


Fig. 3. Multiple photo instrument.

Perhaps none of these devices has undergone recently a more radical change in reception than that of mechanical coring. We used to believe that actual cores from the depths would reveal flow conditions within a reservoir. Elaborate studies in porosity and permeability were made, and the final outcome of all this has been the conclusion that the information so obtained reveals the state of the reservoir interior, and that it does not reveal the events which take place therein during the course of production. Cores receive merely a glance and a touch from the engineer; he relegates them to the geologist for the study of lithologic characters and stratigraphic position for the purpose of correlating beds from well to well over the field. The nature of the rock and species of microfossils which it contains reveal its identity in comparison with what has been encountered before at other wells. The engineer, being more concerned with what takes place within a reservoir, must apply himself to a more systematic study of flow conditions as indicated by the performance of the wells themselves when subjected to definitely known changes which are either naturally or artificially imposed upon them. As an example of the first we have the inevitable changes in the bottom-hole closed-in pressure in the course of production, and of the second we have the raising or lowering of the fluid level in the hole by bailing, swabbing or pumping, and the partial closing or opening of flow-valves at the derrick floor, both of which alter the bottom-hole producing pressure.

To be sure, the attitude of mind which the geologist holds toward mechanical coring has undergone a change recently. Not long ago he ascribed to the lenticularity of sands most of the anomalies we observe in the behavior of wells over a field at large. The lithologic characters of cores seemed to have misled him. Slight alterations in hardness, texture or color induced him to say that particular sands or shales do not extend far, that those found at one well do not exist at another. In view of this circumstance we were not to expect a particular well to be as prolific as another happened to be, and so on. To the physicist studying the performance of wells such a lateral separation of underground reservoirs as was implied by this diagnosis seemed to be refuted entirely by other factors; for example, the uniform decline in production over the field in the course of time, and again, the uniform encroachment of edge water upon the pool. The electrical coring device with its measurements of resistivity and porosity appears to back the physicist in his attitude toward the general extension of reservoirs, one for each well-defined bed of sand, over the field. Only in a very small number of cases when we deal with the overlap or the unconformity of beds are the reservoirs in one portion of a field acknowledged to be separate and distinct from those of another portion of the same field. While these cases are not to be ignored or belittled in their importance, the fact is that reservoirs are now to be considered as extensive ones unless they are definitely proved to be otherwise by means beyond that of mere inspection of mechanical cores.

This change of attitude on the part of geologists took place about a year ago. Strangely enough many of them became so favorably impressed with the results of electrical coring that they jumped to the conclusion that we were through with mechanical coring for all time. But this has not been, and will not be the case, for determinations of the lithology and the stratigraphic position of the sands and shales require all the data we can obtain. Certainly we can, and we have cut down on the amount of mechanical coring at our wells. The work is slow and therefore expensive in comparison with straight drilling. Cores are in fact only necessary at strategic points in the course of making hole.

Determination Of Structure By Coring

Mechanical cores are indeed sometimes extremely necessary in our work. It seems that the greater is the distance between wells the more important are the data to be obtained from the examination

of actual rock samples brought to the surface from depth. We all know the hazards, and consequently the anxiety experienced in the drilling of outlying wells. Some of these, if productive, would merely extend the known limits of a pool previously discovered; others would prove the existence of new pools. The location of a well of this sort with respect to the structure as exposed at the surface may be well known, but if it is to be a deep one, by the time the drill has reached 6,000-8,000 feet the axis of the fold may have shifted laterally because of the thinning of intermediate strata toward one direction. Then, even with a survey of the well properly made, where is the bit with respect to the structure at that depth?

In other instances it frequently happens that a suspected structure at depth is not exposed at the surface. Loose sands, clays, or gravels spread over a flat surface may cover completely any exposures of the subsurface stratified deposits. Cores from shallow test holes which penetrate the top strata will reveal dip angles in advance of drilling. Deeply buried structures of this sort are suspected or detected by geophysical methods, such as the one now extensively used in California and elsewhere, namely, by shooting small charges of lightly buried dynamite and recording automatically with the seismograph the reflected sound waves as they return from surfaces of different densities at depth. Cores obtained on subsequent drilling will likewise reveal dip angles.

Occasionally in the development of certain fields the deeper productive horizons lie beneath well-known unconformities which separate the upper producing zones from the lower ones. The upper zones, for example, may be the lowermost beds of Pliocene age, while the lower zones are the uppermost beds of Miocene age. In case the unconformity exists, the structure below it certainly does not conform to that above it. One or more of the following three factors are bound to be different: the location of the axis of the fold, the direction of this axis, and the dip angles on the flanks of the fold. Cores once more will reveal the dip angles in the lower formations.

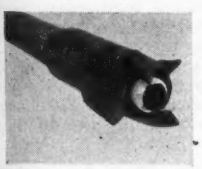


Fig. 2. Outer and inner shoes.

Anomalies in the behavior of wells are sometimes due to the faulting of the productive horizons at depth. These faults may or may not reach upward to the surface. In case they do not, their detection is difficult. Actual cores taken in the vicinity of these breaks in the formation will assist in determining the nature of the faults and their throw, so that adequate provision can be made for them in deciding the depths proper for the completion of the wells.

The work of correlating the beds of sands and shale over a productive area is best when accomplished by combining the results of electrical coring with its recovery of 100 per cent; that is, with its complete record from the top to the bottom of the well, with the results of the study of mechanical cores, though the attemps at recovery may be as low as 5 per cent of the depth of the hole. The latter with their markers, their contacts between shaly and sandy laminations, and their microfossils must not be neglected.

Oriented Cores

Referece has been made to the fact that actual cores reveal dip angles of formations at depth. Given an ordinary core drill, such as the one commonly used for the last ten or more years, the cores delivered by it generally show laminations off the perpendicular to the axis of the cut sample when the drill penetrates the formations at any angle not perpendicular to their bedding planes. Vertical holes will give cores showing the true dip angle of the formations, but the direction of the strike and dip of these formations in place can not be known from one hole alone, since the drill and the core are not oriented. Given three such holes, however, not too widely separated, each of which is either known to be very nearly vertical by acid bottle tests during the full course of drilling, or properly surveyed from top to bottom in case it is known to be considerably off vertical, all the data are at hand for the determination of the compass direction and true angle of the dip, and the direction of the strike is of course at 90 degrees from the direction of the dip. The problem reverts to the familiar geometrical one long designated as "the three-point problem." It is obvious that the distance between the wells, if too great, will give a false determination, even though no faults may have dislocated the beds, because of the changes in the lay of the formation due to folding between any pair of the wells.

As a matter of fact this geometrical difficulty has been largely obliterated by the practice of contouring some definite marker bed over a field having numerous holes. As the limits of the pool become extended the new cores of the later wells provide the data for contouring a greater portion of the structure. The accuracy of the map depends upon the well survey which gives the location and vertical depth to the points where the marker is penetrated, and the number of holes drilled per unit area over the field.

Contour maps are clearly not possible for prospecting wells, whether these be in an entirely new region, or merely off at some distance from the portion of the pool already developed, or in formations below suspected or known unconformities hitherto undrilled in the vicinity.

By means of a special mechanical coring device which extracts from the hole a so-called oriented core the strike and dip can now be accurately determined from a single well. In principle it is not unlike the ordinary core drill; it merely has a few strongly built additional features which provide for the data required in the geometrical determination of the true strike and dip of the strata penetrated. For geologists who are as yet unfamiliar with the simple operation of the device there is of course a certain amount of mystery surrounding it. For this reason a brief description of the apparatus is perhaps warranted here.

The general assembly of the core drill is shown in Figure 1.* It consists of outer and inner barrels, both of which are of steel except for the section between the upper and middle subs. The inner barrel is headed on a thrust bearing which allows it to remain fixed in position, without accompanying the outer barrel in the latter's rotation. Outer and inner shoes on their respective barrels appear as in Figure 2. The outer shoe does its cutting ahead of the inner one, as provided by the compression spring below the instrument case. Full provision is made for the free flow of drilling mud. While the outer shoe does its cutting by rotation, the inner one is fluted and comes down over the core as already cut, slicing off the sides sufficiently for its entrance into the inner barrel. The instrument case with its graduated reference piece, and the flutes of the inner shoe with their internal and external index marks are all put into alignment on making up the drill before lowering it into the well. Inasmuch as the instrument itself, with its batteries, light bulb, compass and clinometer, and two clock mechanisms, as shown in Figure 3, can be set in the case in one way only, it is clear that, provided the core does not twist wihin the inner barrel, it is possible to extract the core from the barrel on the derrick floor, tilt and turn it to exact parallelism and orientation with its original fixed position at depth. Upon this principle alone it is possible to compute the true dip and strike of the formations from which the core is cut.

The lower clock mechanism ticks off the desired four-or eight-minute intervals for the shifting of film and the exposure, while the upper one on being tripped off actually moves the film tape on its spools. In Figure 4 a portion of exposed film is illustrated. The exposures give shadow pictures of the combined magnetic needle and plumb-bob mounted on a stirrup.

Given an excellent exposure of laminat-

A. P. I. Drill Pipe Thread
Upper sub to drill pipe. (Steel)
Thrust bearing. (swivel)
Outer case. (non-magnetic alloy)
Instrument case.
Graduated reference piece.
Compression spring
Check valve mud vent.
Middle sub. (Steel)
Outer barrel (steel drill pipe)
Inner barrel. (steel)
Lower sub. (steel)
Outer core cutter head.
Mud vent on inner barrel.
Inner shoe, fluted internally with external or internal index mark.

Fig. 1. Assembly of oriented core drill.

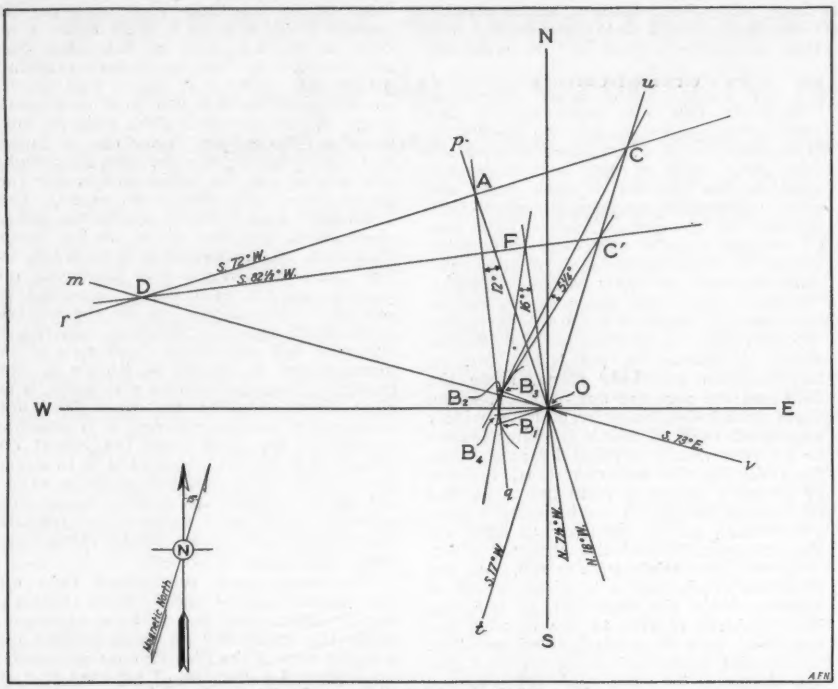


Fig. 4. Portion of strip photographed while coring.

ed strata at ground surface with what accuracy does a geologist measure its strike and dip? Great accuracy is never required. Measurents within eight degrees (four degrees on either side of the correct value) are sufficient for all practical purposes. So it is with measurements at depth, and the coring device appears to operate within this allowable range of precision.

On the landing of the core drill at the surface after a run it is broken at the middle sub, the inner barrel is withdrawn, and the core is extracted with care. Cursory inspection will reveal whether the core has twisted within the barrel after it was cut, for it it has done so, the fluted markings will be broken down. Sometimes the core is broken transversely; then the ends show a polish or attrition by rotation, indicating the fact that after a section of the core entered the barrel, the connection to firm rock was broken at the shoe. The barrel evidently rotated before the next section of the core entered the flutes. Generally this causes no inconvenience, for the photographs of the compass display the angular displacement between the sections. In practice the inner barrel tends to follow the outer one in its rotation, giving the cuts of the flutes a rifled effect approximating a quarter turn in ten feet of core. This can be measured on the core itself, and the same angular rotation will be evident in the photographs.

In cutting core it is customary to cut six to ten feet to make certain that at least one clear and easily measured bedding plane is included. Where beds are thinly laminated a six-inch section of core is of course sufficient.

As previously stated, the compass and clinometer indicate the direction which the hole is taking at the position of the core. Let us say that in a particular case the hole is going at North 17 degrees East, 5 and ¼ degrees off vertical; the laminations on measurement with respect to the axis and orientation of the core show an apparent strike of North 72 degrees East, and an apparent dip of 12 degrees from the horizontal. The problem is now to determine the true strike and dip of the beds at depth. This is solved graphically by the method of descriptive geometry, as illustrated in Figure 5. As with most solutions of problems by this method the drawing appears complicated and quite unintelligible. If, however, we have solved a single one of these examples, their simplicity becomes evident, and the time required for one should not exceed more than five minutes. In the present case the true strike is determined to be North 82 and ½ degrees East, and the true dip 16 degrees.

California Field Problems

An unconformity between the Pliocene and Miocene formations seems to exist wherever their contact is encountered in the fields of the Los Angeles Basin. The structure below this contact in the Montebello Field has now been carefully determined by the oriented core drill.

In the Coyote Field the structure at depth has never been known definitely. Recently a prospecting well on the extension of the anticline showed steep dips in the ordinary cores. The oriented drill was run to determine the strike and dip of the formations at the location. A preconceived notion of the position of the well on structure was entirely substantiated. The shifting of the structural axis toward the southwest had been suspected for some time. Although the well started just off the crest on the south flank at the surface, it landed on the north flank considerably off the crest at depth. The well had been drilled within specified limits of verticality; the hole had not drifted laterally any appreciable extent.

In the Seal Beach Field only by means of the oriented core has the partial determination of the Miocene structure been determined. Other holes are now to be cored likewise to complete the picture. The structure appears to be a single one underlying both the Seal Beach and Alamitos pools within the Pliocene formation.

Block faulting in the center of the Dominguez Field, previously discovered by ordinary coring methods, has been examined in detail by the oriented core. Anomalies of production from edge wells in the Miocene seem to be accounted for satisfactorily.

In the Santa Fe Springs Field there appears to be a thickening of beds from the crest toward the north flank of the fold between the O'Connell and Hathaway zones. The structure is symmetrical above this horizon. A few wells in which oriented cores were taken have furnished accurate information regarding the deep asymmetry.

At the Long Beach Field many peculiarities of production are to be noted at wells in the Miocene formation. It is probable that the axis of the structure has shifted toward the south on depth, so that wells appearing to be on the edge in the Pliocene evidently penetrate near the crest in the lower horizon. The facts have not yet been verified by the oriented core drill.

Outside the basin there are several areas wherein questions regarding the structure at great depths may possibly be settled by means of the oriented core. An interesting case appears in the Ventura Field, where a shifting of the axis on depth has been suspected by some geologists. A few holes tested by oriented cores may aid in clearing up the situation with respect to the fold below the Gosnell Shale.

Conclusion

Our attitude toward the coring of formations during the process of drilling has changed materially in the last year or so. By the introduction of electrical coring the footage of mechanical coring has been reduced to a small percentage of the earlier amount. Electrical coring, however, can not replace mechanical coring entirely, because the study of lithology and microfossils can not be ignored in the successful development of our fields. Under special circumstances,* as we often find in prospecting beyond or below the proven extension of pools and zones, the oriented mechanical core has its advantages in furnishing required data either from single holes or from a few holes well selected according to their position on the structure.

Fig. 5. Graphic solution of correct strike and dip from apparent readings.

*Drawings and photographs are furnished through the courtesy of George A. Macready, Los Angeles.

Standard Oil Co.

Bahrein Pipeline Completed

As Valley Line Starts

When Standard Oil Co. of California early next spring completes its 108-mile pipeline from Rio Bravo station in Kern county to the company's marine terminal at Estero Bay, just north of San Luis Obispo on the Pacific coast, it will mark the placing in commission of two great pipeline projects within a little more than a year's period. The first one while not so extensive as the Rio Bravo line which was begun a few weeks ago, is of even greater importance from an industry standpoint, for it made possible the shipping of oil from the new field opened on the Bahrein Islands in the Persian Gulf by Standard's wholly owned subsidiary, The Bahrein Petroleum Co., Ltd.

On August 1, last, the Standard tanker El Segundo reached Richmond after completing a round-trip voyage begun eight months before. During the tanker's stay at Bahrein Island, a complete marine terminal was built and her first cargo of Persian oil was loaded through the finished pipeline. Homeward bound, she discharged all but a few hundred barrels of her 25,000-bbl. cargo in Yokohama. The rest was delivered to Richmond for analysis and testing. All of this oil is intended for foreign markets. None of it will compete with domestic crude.

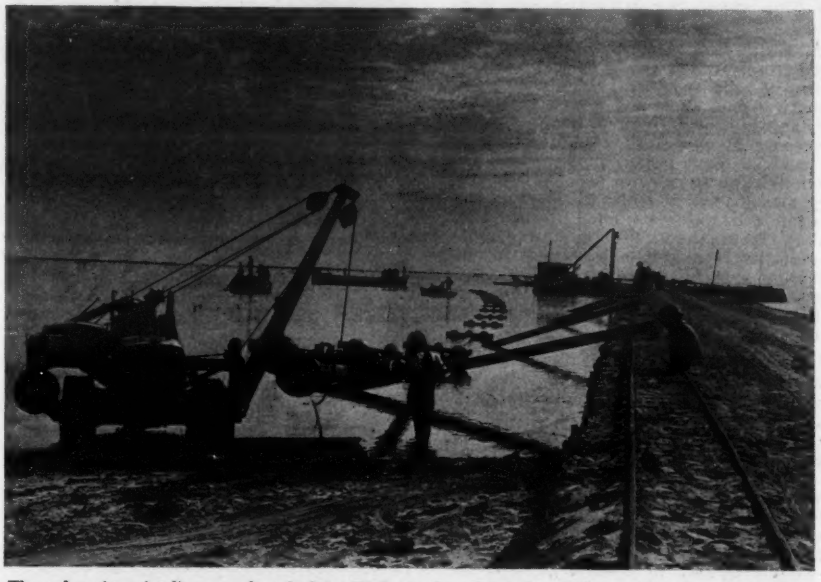
Completion of the Bahrein terminal facilities—by aid of native labor and by utilizing ancient traditions to introduce modern equipment and transportation methods in this out-of-the-world locality—was an outstanding achievement for it put the finishing touches to a Standard project which opened the resources of a vast new oil field.

From a California standpoint, the Rio Bravo project is likewise important. It is the third Standard pipeline with the Estero Bay as its terminus, indicating that the port will become one of the busiest oil shipping points on the Pacific Coast. Two of these lines will carry crude, the third gas. The first of the crude lines was laid five years ago, followed by the gas line—both of them from Kettleman North Dome—when the demand for gas for northern points warranted such construction. The new line now under construction will give a salt water outlet for San Joaquin Valley crude.

Low handling charges for Kettleman crude (after the construction charges are written off) was the motivating factor in establishing the Estero Bay terminal, and it was but natural that the company should look to the same means of handling other valley crude.

The line will consist of 108 miles of 12-inch electrically welded pipe, most of it treated to offset excessive corrosion. Starting at the company's Rio Bravo pump station in Kern county, running to a junction with the present Kettleman Hills-Estero line at a point in the Cholame Valley, and thence paralleling the Kettleman right-of-way to Estero, the line traverses the Valley, completing the circuit. A considerable portion of the oil that will move through the new channel is the heavy viscous crude produced in the Kern River district. In order to pump this oil economically, it must be maintained at a high temperature, which means that combined pumping and heating stations must be located at fairly frequent intervals along the route. Present plans call for the installation of five such plants, about 18 miles apart. At each unit, arrangements will be made to pass the heavy oil through heaters into which exhaust steam from the pump is discharged. Thus the maximum benefit is derived from every pound of steam used. The heaviest oil will be heated to a maximum temperature of about 180 degrees, and this system will be designed to handle as much as 50,000 bbls. a day of this heavy oil, and up to 70,000 bbls. daily of lighter oil.

Steel tankage to hold some 700,000



The submarine pipe-line was launched in 500-ft. sections from the tracks on the pier. Steel floats in pairs suspended the line while it was being towed out to position. The ends of each section were capped by blind flanges, which were cut off by acetylene torches when the sections were ready to be coupled up.

In the construction of the terminal buildings, the freight-handling pier, and the piers under the first mile of marine pipe-line, thin slabs of sedimentary rock were pried up at low tide from the shoal bottom of the gulf off Bahrein Island. The material is light in weight and is carried by men or donkeys.

bbls. is to be constructed at Rio Bravo—the focal point for accumulation of both heavy and light crude. All modern protective appliances will be installed. A new submarine line also will be laid along the ocean floor, diverging sufficiently from the present line so that their ends will be far enough apart to permit two tankers to load simultaneously. This will be the second submarine line laid this year by Standard on the Pacific Coast. The first was laid at El Segundo to permit direct loading of tankers from Standard's refinery there. This diverted a large percentage of the Standard's coastal business from Los Angeles Harbr to its own plant, thereby effecting a large saving in tanker-loading costs.

In the Persian Gulf, Standard's Bahrein project marks a colorful phase of Far East development. Accompanying photographs tell a more or less realistic story of the problems involved. The gathering line, of 6- and 8-inch pipe, was laid across a rough, dry country, with some marshy places. Trenches were dug by local laborers, none of whom had had previous experience with pick and shovel; they also placed the pipe in position and assisted the welders. The oil flows by gravity from the wells, in the central part of the Island, to a low point in the gathering system. Here it is pumped over a slight rise that rims the interior valley, again to flow by gravity to the tanks at tide water.

The terminal is located on Sitrah, a small island separated from Bahrein Island by a shallow channel. Preliminary work included construction of a road to the terminal site, with a fill and trestle over the water. Teakwood piles from India were driven by an improvised pile-driver utilizing an old drill stem and a 500-pound jammer operated by 25-manpower. Pine timbers were carried from California by the El Segundo. The ruler of the 230-square mile state of Bahrein presided over the ceremonies which attended the opening of the bridge.

Tank-shells were transported from California, along with riveting and welding outfits, and under the supervision of experienced employes, the Bahrein workers became quite expert with hot rivets and rivet-yokes, and in wielding brushes when the completed tanks were coated with red lead and finished with aluminum paint. A 7500-bbl. tank was erected to take care of the ballast water from incoming ships, as every precaution was taken not to pollute the waters of the Gulf. The hook-up is made through the 3-mile long pipeline; the ballast water is pumped into the shoreside tank where a skimming pump removes the oil. A fresh water tank also was built for the new and thoroughly modern employes' camp which replaced the old one at Jebel.

During the months of work, four specially designed short-wave radio-telephone units were employed very successfully in communicating between the anchored ship and the terminal units. These sets remain on the job, and will be used during future loadings.

Almost exactly two years previous to the departure of the El Segundo with its first cargo of oil, the discovery well near Jebel Dukhan started its flow of gas and oil. The submarine terminal is the connecting link between the field and ports of call all over the world.

Here is a mason-gang working on the pipe-line piers, one of which is seen at the left. Mortar is mixed in small batches by hand and carried on heads, the age-old custom when houses are built. Moden tools were unknown to these workmen; some they learned to use skillfully; in other cases old ways seemd best.

Two bits of work on the Bahrein pipe-line are shown here. (Upper) Tying-in a 500-ft. section; (lower) tack-welding pipe joints on the first 5700-ft. portion.

Los Angeles World's Leading Oil Port; Follows New York In General Commerce

Los Angeles harbor is the world's largest oil shipping and bunkering port. Long ago it captured this honor from Tampico. Furthermore, it is first in the United States in volume of outbound tonnage of all kinds. It is also first in total outbound intercoastal tonnage. It is second only to New York in total tonnage in and out, in total foreign export tonnage, in total foreign trade, and in total intercoastal and coastwise tonnage. Ships of 179 companies, including 40 oil and 21 lumber carriers, connect the port with every port of the world. Fifteen U. S. intercoastal lines connect with Atlantic ports and three with Gulf ports.

Delegates to the A. P. I. 1935 convention in Los Angeles, who can spare a little time, should by all means make the trip one way by sea via Panama. Splendid passenger accommodations are available.

Los Angeles harbor, besides its importance to the movement of oil, is one of the best reasons for the location of factories and many lines of business in Southern California. Three trans-Continental railroads and the local Pacific Electric serve the port. In addition, the equable climate makes it economical to use trucks on a large scale for delivery direct to and from steamer to warehouse and factory.

Los Angeles harbor is highly developed but capable of extension. Municipally owned and controlled, it has every advantage to offer business. Long Beach harbor is in every way, except municipally, a part of one great port.

Tonnage and Values

During the five years ended Dec. 31, 1933, the total commerce passing through Los Angeles harbor has averaged 22,500,000 tons per annum, value $902,535,543, divided as follows:

	Tonnage Per Cent	Value Per Cent
Petroleum	79.34	22.71
General Cargo	14.93	74.37
Lumber	5.93	2.92
Total	100.00	100.00

General cargo shipments and recepits have increased with the growth of Los Angeles and its territory, which growth is closely connected with the oil industry. General cargo also includes oil well and refining equipment, for this region manufactures and ships to the Atlantic Coast and all parts of the world equipment for drilling wells, transporting and refining oil, and it also receives such equipment from the East Coast. When drilling operations are at their height, new refineries being built and older ones extended and renovated, these shipments are quite heavy. Lumber, trucks, pipe, engines, motor cars and many similar articles which make up general cargoes are used by the oil companies.

Total 1933 commerce in and out of Los Angeles comprised 16,662,258 tons, value $759,569,591, of which oil represented 77.9% of the tonnage and 24.3% of the value. During 1932, the total commerce in and out amounted to 17,715,470 tons, value $742,868,365, of which oil represented 81.2 of the tonnage and 24% of the value.

Harbor Close to Oil Fields

Within 30 miles of Los Angeles harbor there is produced approximately 50% of California's oil, amounting to a total of 468,427 bbls. per day during September. Eighty per cent of all outbound shipments —foreign, Hawaiian, intercoastal and coastwise—go through the Los Angeles customs district, and by far the greater part through Los Angeles harbor. The rest goes through El Segundo, Port San Luis, Estero Bay, Elwood and Ventura.

Besides the crude oil from the wells within the Los Angeles Basin and refined products from the refineries in the same district, two big pipe line systems connect Los Angeles harbor direct with all the fields of the great San Joaquin Valley. The first pipe line was built some 20 years ago by the General Petroleum Corp., now the California subsidiary of Socony-Vacuum. It taps every field in the San Joaquin. The second line was built recently by the Pan American Petroleum Co., headed by E. L. Doheny. It is now part of the Richfield Oil Co.'s system.

Originally the shipment of oil from Los Angeles was mostly of crude. Before the great discoveries in Los Angeles Basin during 1921, 1922 and 1923, the bulk of the state's oil was produced in the San Joaquin Valley. Much of it went by pipe line to San Francisco, and seaborne trade, domestic and foreign, and most of the refining was largely centered there. With the huge developments of crude around Los Angeles all the com-

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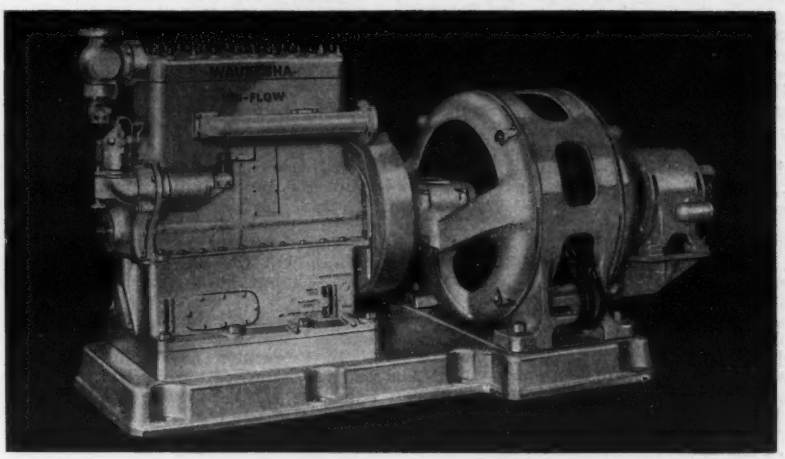

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panies built big refineries close to the harbor, and soon the character of the shipments began to change. Now 75% of all oil shipments are of refined products.

Present Movement of Oil

During 1933, total shipments of oil, crude and refined, to all parts of the world—coastwise, intercoastal, Hawaiian and foreign—through Los Angeles harbor, were valued at $133,118,486; during 1932 at $142,129,327. Bunker fuel to a total of 2,383,016 tons (21,286,832 bbls. at seven barrels to the ton), value $16,329,189, was supplied to ships moving to and from every part of the world during 1933; during 1932 to a total of 3,040,976 tons (21,286,832 bbls.), value $12,057,791. Increased 1933 bunkering demand over 1932 indicates an increase in general shipping business, notwithsanding a slight decline in tonnage, last year as compared with 1932. Indeed, the number of ships arriving during 1933 was 6533, with a net tonnage of 19,868,599, against 6206 ships, net tonnage 18,648,529, during 1932.

Shipments of oil well and refinery equipment amounted in value to $2,375,711 during 1933 and to $2,431,442 during 1932.

Receipts of oil, either crude or refined, are, of course, smaller than the outgoing movement. The coastwise shipments of crude arriving from up-the-coast pipe line terminals for the nearby refineries, and of refined goods from San Francisco Bay refineries (mostly of lubricants and specialties which several companies make exclusively in their northern plants), and the eastern lubricating oils received chiefly in bulk make up the greater part of the receipts. Foreign imports to the Pacific Coast are negligible and are seldom made except for testing or experimental and scientific purposes.

Here are outgoing bulk shipments to all parts of the world:

	1933 Barrels	1932 Barrels
Coastwise	29,687,171	39,982,058
Pacific Foreign	17,824,089	20,258,436
Intercoastal	17,354,144	9,615,137
Atlantic Foreign	3,356,561	4,925,497
Total	68,221,965	74,781,128

Coastwise shipments include all oil consigned to United States Pacific ports from Alaska to Mexico. All Oregon, Washington, and Idaho business is moved by tanker to Portland and Puget Sound and there distributed by rail and truck to inland points. It will be seen that they constituted 43.37% of the total business of 1933 and 53.47% of 1932.

The big increase in intercoastal business last year over 1932, while all other shipments declined, is the oustanding feature of the above figures. In fuel oil these shipments were 104,636 bbls. in 1932 but during 1933 they jumped to 3,721,814, due to the elimination of the heavy Mexican and Venezuelan oils. This year these shipments are still greater and supply a great percentage of the Atlantic Coast fuel market. They have relieved California of the staggering burden it has been carrying for years in the form of 100,000,000 bbls. of unsalable fuel oil. Gasoline shipped to the Atlantic Coast last year amounted to 10,922,818 bbls.; in 1932 to 7,757,529.

Japan is the biggest foreign buyer, by far, of California oil. Of the rest, British Columbia gets substantial quantities, Australia takes some, and the remainder is scattered.

Atlantic foreign shipments have gone to Europe and South America chiefly. Brazil, Uruguay and Argentina have taken some.

Here are the amounts of crude and of each refined or partially refined product:

	1933 Barrels	1932 Barrels
Crude	6,636,080	14,946,359
Fuel	23,744,845	20,964,343
Gasoline	27,288,317	29,196,365
Kerosene	3,835,199	3,776,441
Distillate	711,902	608,951
Diesel	5,520,690	5,256,241
Road Oil	484,932	9,151
Batching Oil	.....	23,277
Total	68,221,965	74,781,128

Delegates To Leave On A. P. I. Special

Friday, Nov. 8, at 3 p.m., the California A. P. I. special train will leave Los Angeles for Dallas. Running via Southern Pacific to El Paso the train will lay over there eight hours Saturday afternoon to give the delegates a chance to see the city and its attractions and then will run over the Texas & Pacific to Dallas arriving at 3:10 p.m. Sunday, so as to give the passengers a chance to rest over night before the opening of the first sessions Monday.

Returning, the delegates will choose their own trains with the privilege of stopover at any point within the limit of 30 days.

Here is a partial list of those who will go:

T. A. O'Donnell, first president, American Petroleum Institute.

Standard Oil Co.—Oscar Sutro, vice-president; P. H. Patchin, assistant to the president; E. W. Wagy; L. E. Fleming; Mr. Bedford; and others.

The Texas Co.—P. H. O'Neil, director; C. E. Olmstead, president The Texas Co. of California; R. T. Herndon; J. A. Bermingham.

Rio Grande Oil Co.—C. S. Jones, president, Bruce Barkis; Petroleum Securities—Doheny-Stone Drill Companies—Frank Seaver, R. E. Silent; American Petroleum Institute—Col. F. E. Foster; Amtorg Trading Corp.—Mr. Poliakoff.

Union Oil Co.—L. P. St. Clair, president. Reservations have been made for 17 others.

Republic Steel Co.—J. Fred Gilmore, Geo. F. Emanuels; Associated Oil Co.—W. F. Ackerman; Oil Well Supply Co.—Mr. and Mrs. Lester H. Keim; National Tube Co., Ben Stroud; Axelson Manufacturing Co.—J. C. Axelson, D. M. Hammett; Crane Co.—Mr. Brooks; Twin State Oil Co.—Lewis Grimm.

Shell Oil Co.—E. W. Masters and others; General Motors Co.—Mr. De Ridder; Timkin Bearings Co.—Mr. Currie; Ducommon Corp.—Mr. Howard; Western Belt Manufacturing Co.—Mr. Tyron; American Steel Pipe Manufacturing Co.—Mr. Timmons; Quaker State Oil Co.—Mr. Houston; Petroleum Engineer—Clarence Morris; California Oil World—A. R. Hinton; Southern Pacific Co.—R. McQuiston; Texas & Pacific R. R.—J. C. Sands.

National Supply Co.—D. S. Faulkner, vice-president; Edward Timbs, chief engineer; M. P. Archer, chief engineer, Toledo, Ohio.

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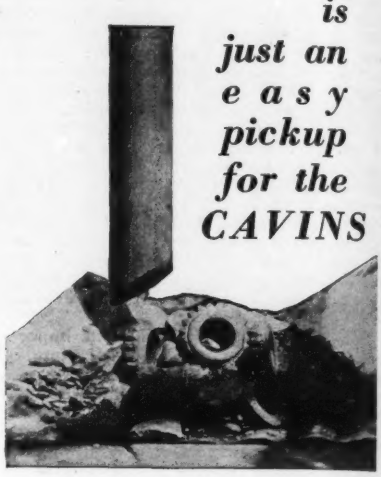

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California Oil Twice As Valuable As All Gold Mined In State Since 1848

By Arthur Richard Hinton

GOLD—to every mind its name brings a picture of wealth untold. It appeals to the imagination as nothing else can. Today it fills the public eye because of the world controversy over the gold monetary standard. Men are seeking it with renewed activity. New lodes and placers are being sought, old ones revived and worked over. California, the golden state, last year and this revived its gold operations on a growing scale. Again the question of repealing the state law which now restricts hydraulic mining is being agitated.

During 1932 the world's new supply of gold totaled $475,452,196, of which sum the United States mined $37,823,000, or 7.98%. California remains the "Golden State", the foremost producer of the precious metal in the Union, its 1932 output having been $11,765,726, equal to 31.1% of the national total and 2.5% of the world's total. During 1933 there was an increase in California operations and the year's yield was $15,683,075.

U. S. Oil Exceeds World's Gold

But during 1932 the United States produced **785,159,000 bbls. of crude oil, the value of which at the wells was $680,460,000, or $105,007,804 more than the world's production of gold during the same year.** In other words, the value of U. S. crude oil was 22% more than the entire world's output of gold that year. Stated still another way, the world's 1932 output of gold equalled only 69.8% of the value of the U. S. output of crude oil.

During 1933, the U. S. output of crude oil rose to 905,656,000 bbls., but declined in value to $608,000,000. There was certainly a big increase in the value of the gold output but undoubtedly the oil was worth far more.

California Oil Vs. Gold

Of California it has often been said that **"the state's oil has been worth more than all the gold mined from its lodes and placers".**

How literally true this statement is has been strikingly set forth in the reports of the State Division of Mines which show a total output of gold for the state since Jan. 1, 1848, down to the end of 1933, a period of 85 years, amounting to $1,879,919,157, and that the value of the crude oil produced at the wells since 1876 down to Dec. 31, a period of only 58 years, totaled $4,074,491,151. In other words, **the value of the state's oil since the beginning of the industry in 1876 has been more than twice the total of the gold mined since its discovery in 1848.**

Eighteen fifty-four was the peak year of California gold when $69,433,931 was taken from the state's lodes and placers. During 1933 the state's crude oil was valued at $143,063,972, or more than twice the output of gold during 1854. Oil production reached its peak in value during 1926, when it totaled $345,546,677, according to the state's figures, a sum nearly five times the 1854 output of gold.

Oil and Gold Compared Now

California still leads the nation in gold, but its yield is only a fraction annually of the value of the state's crude oil. **During 1933, its gold came to $15,683,075, equal to only 9.28% of oil production for the year.** During 1932, California mined $11,765,726 in gold and produced crude oil to a total value of $142,890,247. Thus the value of the oil was more than 12 times that of gold.

Oil Exceeds All Others Combined

During 1887, the value of California oil for the first time exceeded $1,000,000. Since Jan. 1 that year, down to Dec. 31, 1933, a period of 48 years, the value of all minerals produced in California has amounted to $6,473,750,466. Of this total, $4,070,884,634, or 64.5%, represents the price of crude oil at the wells. Gold produced during this period amounted to $716,749,639, or 11.4% of the total value of all minerals and 18.2% of the value of the crude oil. Gold production during this period was, of course, at a low ebb compared with the previous 37 years, during which time it climbed to $1,163,169,518.

Nineteen eighteen first saw a year's production of California wells worth more than $100,000,000. That year its value was $127,459,221 against $86,976,209 during 1917. The 1918 total value of all California minerals was $199,753,837, so that that year's oil was equal in value to 64.5% thereof. Gold mined during 1918 amounted to $16,529,162, or 8.27% of the total mineral value and 12.9% of the value of the crude oil.

California crude oil reached its highest total value during 1926 when the year's production was worth $345,546,677 (nearly five times the gold mined during 1854, the state's year of greatest yield, as previously stated). Total 1926 value of all California minerals was $450,330,856, the greatest in the history of the state, of which oil amounted to 76.7%. Gold that year amounted to $11,923,481, only 2.64% of the grand total and only 3.45% of the value of the crude oil.

Nineteen twenty-nine witnessed California's smallest output of gold since Jan. 1, 1849, only $8,526,703. The same year California's oil was worth $321,366,863, the total mineral production $432,248,228. In other words, during 1929 oil constituted 74.35% and gold only 1.9% of the total.

Of the eight California counties standing first in value of mineral production seven were oil-producing and from 85% to 98% of their mineral values represented oil, with natural gas a considerable part of the remainder. These counties and the total value of their 1933 mineral production were as follows:

Los Angeles	$68,785,294
Kern	27,877,930
Kings	25,474,252
Orange	19,263,581
Ventura	14,558,096
San Bernardino*	8,973,598
Santa Barbara	7,011,773
Fresno	3,901,103

*Not an oil-producing county.

The following table shows California production of oil and natural gas and of gold in full for 1933 and 1932:

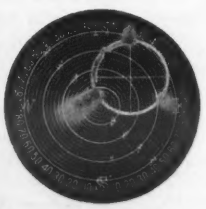
Minerals	1933 Value	1932 Value
Petroleum	$143,063,972	$142,890,247
Natural Gas	15,403,514	16,272,061
Combined	$158,467,486	$159,162,308
Gold	$ 15,683,075	$ 11,765,726

Dairies Buy Dry Ice

Arizona dairies and other consumers of ice are now buying the carbon dioxide product manufactured at Niland from the output of the Imperial county wells. The dry ice plant built by Carl M. Einhart and his Los Angeles and Pasadena associates has been in operation about 30 days and is turning out enough for the entire Imperial Valley market, so Mr. Einhart has been canvassing Arizona for trade. The plant occupies a handsome building of the mission style and has a capacity sufficient for all demand in sight at present. It is capable for enlargement whenever the need may arise.

A Santa Ana syndicate headed by a Mr. Chandler plans to drill for carbon dioxide gas at a point between six and seven miles southeast of Niland. In the event of success it is understood that they will build another dry ice plant near their wells and plan to ship the ice, packed in drums, for the use of small consumers—ranchers and other domestic users.

Oil and natural gas are to be sought by the Barth Oil Co. of Los Angeles, of which John Barth of Altadena is president, in a well now suspended at 620 ft. on sec. 5, 11s-16e, with 585 ft. of eight-inch casing in the hole. Mr. Barth says that the well has encountered showings of carbon dioxide gas at 375 and 610 ft., and that he has been advised that natural gas should be found at 950 and oil around 1200 ft.



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Terminal Oil Co. Plans Alberta, Canada, Exploration

A transaction that should eventually have an important bearing on oil development in Southern Alberta, Canada, was recently consummated in Los Angeles.

Some years ago, Marland Oil Co. in conjunction with Hudson's Bay Co., initiated a comprehensive program of geological reconnaisance work covering the Prairie Provinces of Canada. Among others in charge of the field work were Glenn Ruby, J. W. Irwin, Ben Hake and Neal and Robin Willis. Subsequently, these gentlemen formed the Nordon Corp., and carried on the work, eventually localizing on several areas in Southern Alberta.

Through their efforts, Prairie Oil & Gas, through its subsidiary Parco, drilled on the southern flank of the Twin River structure and developed a million-foot gasser. About two years ago, S. Myron Zandmer, prominent local geologist, who has also spent much time in Southern Alberta, interested a group of Los Angeles operators in drilling a second well on this structure. This well, the Roney-Nordon, came in from the Madison Lime at a depth of 3940 ft., flowing at an estimated initial rate of 500 bbls. of oil and 8,000,000 c.f. of wet gas. The casing pressure was 1500 lbs. per square inch. However, the well was shot, caught on fire, and a bad cave developed below the shoe of the casing, between the shoe and the lime. The showing in this well, in spite of the bad luck, proved the Madison Lime to be productive, and the same interest are planning to drill another well located about a mile or so north on this structure.

West of Twin River about 10 miles, a large amount of detailed field geological work carried out by Nordon, definitely esablished the Del Bonita structure. The surface geology was confirmed by the drilling of 15 core holes varying in depth from 250′ to 700′.

This structure, comprising about 7500 acres, has been controlled by Nordon Corp. of Alberta, Ltd., for a number of years and recently was sub-leased by them to Terminal Oil Co. of Los Angeles subject to an overriding royalty. Terminal Oil Co. is now rigging up with heavy duty rotary equipment to drill a test to the Madison Lime in sec. 18, 1s-21W 4th M. Associated with Terminal in this project is S. Myron Zandmer who is now in Canada supervising operations. P. K. Adams, a former local Standard driller, is in charge of drilling, and is especially qualified by reason of his long experience as superintendent for Imperial Oil Co. in the Turner Valley, Red Coulee and Wainwright fields in Alberta.

The location of the test is three miles north of the international boundary and about 20 miles northwest of the Cutbank, Montana, production. During the past summer, British-American of Canada completed a pipeline from the Cutbank field to Coutts, Alberta, as practically all of the Cutbank and Kevin-Sunburst crude is refined at Coutts.

Production is expected from the Blackleaf, Sunburst and Cutbank sands between the depths of 3500′ and 4850′ and from the Madison Lime at 5100 ft.

Irvine Stewart, local geologist, has been prominently identified with the development of Cutbank which was discovered by the "Tip" O'Neil interests about two years ago. This field is a monocline while Del Bonita, being a closed dome, is expected to produce larger wells due to concentration in a much smaller area. It is estimated that Cutbank will produce, during its life, 200,000,000 bbls. of oil.

There is a crying need for crude in the Prairie Provinces, and instead of curtailment every co-operation is given in order to produce the maximum amount of oil. The Twin River oil tested 32 gravity and the price for oil of that quality is more than $1.50 per bbl. at the well. It is also interesting to note that Canada imports about 35,000,000 bbls. of crude and refined products per annum and produces only about 3% of its requirements.

Operating conditions are similar to those of the Cutbank and Kevin-Sunburst fields were drilling is carried on throughout the winter, and at the present time some 40 wells are being drilled in these two fields.

Headquarters for the Terminal Oil-Zandmer operations have been established at Milk River, Alberta.

Crude Oil Prices In California Compared With Prices Elsewhere

With a potential production approaching 1,000,000 bbls. per day, California is third among the states in actual production of crude, with Texas first and Oklahoma second. In aggregate value of its production, California was second only to Texas and exceeded Oklahoma by $22,500,000 during 1932 and 1933. Huge East Texas production alone put the aggregate value of that state's output ahead of California. The 1933 average price per barrel was 83 cents in California and 56 cents in Texas. During 1932, California's average price was 81 cents and Texas' 83 cents. Oklahoma's 1933 average price was 66 cents per barrel; 1932, 90 cents.

California was the only state, Michigan excepted, where 1933 prices were higher than during 1932. Every other state dropped. These declines in price ranged from two cents per barrel in Pennsylvania, New York and West Virginia, up to 27 cents in Texas and 28 cents for the small production found in Alaska, Missouri, Mississippi, Tennessee, and Utah. Michigan received an increase of 14 cents in price.

Nineteen thirty-three's top prices were $1.87 per barrel in Pennsylvania and New York, two cents less than during 1932. West Virginia followed with $1.54 average for 1933, Ohio third, $1.07; Montana fourth, 98 cents; Michigan fifth, 90 cents; the other Appalachian states close behind. These states with small production, mostly spcial grades, and each with unique marketing advantages, alone obtained better prices per barrel than did California.

California In 1934

Production of California for the first eight months of 1934 totaled 117,824,000 bbls., an increase of 3,423,000 bbls. over the same period for 1933. This increase was due to enhanced development of Huntington Beach and of new fields such as Mountain View, and to the opening of many wells in older fields. Kettleman Hills, bringing in new huge wells and immediately shutting them in, shows a slight decline this year compared with last, while both Santa Fe Springs and Long Beach are falling off, the latter despite extensive new drilling.

Below is the table showing the 1933 and 1932 production and its value in the three leading states:

(Thousands of Barrels and Dollars)

1933		
State	Output	Value
Texas	402,609	$225,000
California	172,010	143,300
Oklahoma	182,251	120,800
1932		
State	Output	Value
Texas	312,478	$259,700
California	178,128	144,600
Oklahoma	182,251	137,920

Total 1933 national production of crude came to 905,656,000 bbls., value $608,000,000; 1932 to 785,159,000 bbls., value $680,460,000. The price of crude at the wells throughout the nation averaged 67 cents during 1933 and 87 cents during 1932.

California's Big Wells

California's 1933 average daily yield per well was 47.4 bbls., against Texas 24 and Oklahoma three. The 1933 national daily average was 7.7 bbls. During 1932, California wells averaged 54.7 bbls., Texas 21, Oklahoma four, and throughout the entire country 6.7 bbls. New Mexico alone had a higher average output per well than California, 75.1 bbls. during 1933, 74 bbls. during 1932, although several fields within Texas and Louisiana averaged higher both years. However, several fields, notably Kettleman North Dome, had much higher averages per well than the state at large.

California required 10,900 active producing wells during 1933 to yield its output, against 48,100 for Texas and 56,850 for Oklahoma. During 1932, only 8,900 wells were operated in California, 43,630 in Texas, and 34,530 in Oklahoma.

Union Promotes Estill

E. H. Estill, an attorney in the credit division of the Union Oil Co., has been elected an assistant secretary of the company. Mr. Estill graduated from U. S. C. Law School in 1926, was admitted to the state bar in the following year, and has been with the Union Oil Co. for several years.

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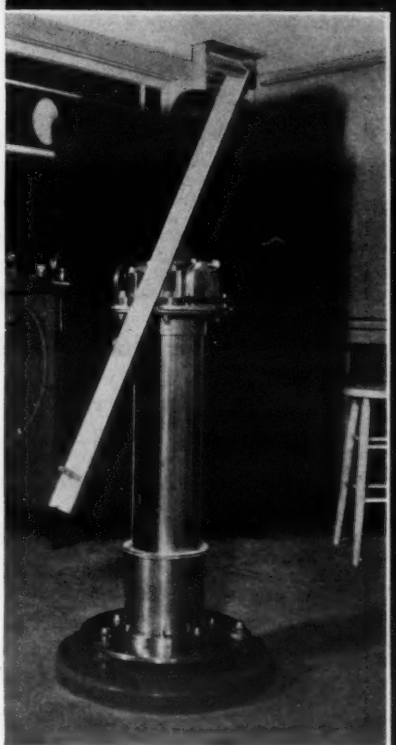

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Standard Modernizing Refineries At Richmond, El Segundo

Standard of California has under construction an extensive modernization program in its refinery at Richmond, California. Proposed improvements include wharf repairs and extension, increased crude oil receiving facilities, crude oil distillation equipment, and lubricating oil refining and treating plants.

It is anticipated the expenditures will aggregate some $2,000,000. A good portion of this work is being done on contract. Auxiliary additions and facilities to accommodate the new plants to existing equipment will be done by the company forces. According to present plans, the major program is scheduled for completion near the first of next year.

A combination atmospheric and vacuum unit is now being constructed, which, when completed, will be capable of feeding 21,000 bbls. per day of selected crude oil and producing a total of 11 closely fractionated streams varying from a light gasoline to a heavy lubricating distillate, in addition to specification road oil and asphalt bottoms. A special rerun unit for refining lubricating oils is also under way, which will have a feed capacity of 3500 bbls. per day, producing at least four streams of high quality lubricating distillate. The total contract price for the work is approximately $1,000,000.

Construction of a selective solvent plant for treating lubricating oils has been started on contract. This plant will have a rated capacity of 2200 bbls. per day based on finished oils. In addition to the treating facilities, the plant contains a complete recovery system for minimizing the losses of high priced solvents. The contracted portion of this plant, including certain manufactured equipment, amounts to over $250,000.

New crude oil handling facilities at the refinery for receiving 70,000 bbls. per day of oil by tankers are contemplated. A part of this crude oil delivery is now being made over the valley pipe line system. The new additions at the refinery probably will include an extra berth at the wharf, large crude oil delivery line to the shore, pump booster station and discharge line system to refinery tankage. Pipe lines will be as large as 20 inches, permitting economical pumping rates of 10,000 bbls. per hour. This work, together with the rebuilding of the wharf approach superstructure, which is nearing completion, will cost approximately $500,000.

The company is also modernizing certain parts of its El Segundo refinery in Southern California. Electrification of pumping equipment, improvements in distillation and extended facilities for receiving, as well as discharging, crude oil over the present submarine terminal are actively under way. The estimated cost of these projects totals nearly $250,000.

Valley Operators Meet

At a special meeting of the San Joaquin Valley Oil Producers' Association to be held at the El Tejon Hotel in Bakersfield Nov. 8 at 8 p.m., matters of direct bearing on the present plan of operation of the Oil Administrator's order dividing the state into three districts and results of such division are to come up for consideration. This method, which hinges largely on the distribution of the crude quotas, caused some dissatisfaction when it was announced—particularly among northern fields which feel that they have been discriminated against by the use of "refinery demand" as applied to crude allocations. The wage scale order regarding back pay, and a discussion of the legislation program to come before Congress and the next session of the California State Legislature were other matters mentioned by President Dana Hogan in his letter calling the meeting.

Berman Starts Well

Morris Berman, formerly vice-president and later receiver of the Dollar Oil Co., is starting a new well north of Hill and east of Gaviota, Signal Hill. He has recently been drilling at Huntington Beach.

Four Poso Wells Planned

D. T. Stevens of Long Beach, who has drilled one successful well at Poso Creek, now expects to put down a group of four. They will all be about 2000 ft. in depth.

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California Production Drops 25,000 Bbls. Daily In September

September saw California production cut by 25,000 bbls. to 468,000 per day, in accordance with the national stabilization program. Refinery runs were cut by 13,000 bbls. daily to an average of 419,000. The figures as to production of crude are from the American Petroleum Institute's Pacific Coast office, those of refinery runs and output are from the U. S. Bureau of Mines. The reduced refinery runs and 1000 bbls. less in shipments (26,000 bbls. per day) resulted in increasing the stocks of California refinable crude during September by 13,000 bbls. daily, or a total of 394,000. They totaled 394,000 bbls. on Sept. 30.

During the first nine months of 1934, as compared with 1933, there was an increase of 8000 bbls. daily in production of crude oil, bringing it up to an average of 483,000 bbls., and an increase in refinery runs of 1000 bbls. daily, bringing them up to an average of 433,000 bbls. Shipments also increased during the period by 1000 bbls. daily to 27,000. Comparison of the average for nine months with the September average seems on its face to point to a better compliance with curtailment orders. However, the weekly estimates of October production show a decidedly upward trend.

Natural Gasoline

September output of natural gasoline was 34,000 bbls. daily, the same as in August, but utilization increased by 3000 bbls. to a total of 27,000 per day. Shipments dropped 50% to 1000 bbls. daily. Natural gasoline statistics during the first nine months of 1934 differed little from 1933 statistics. Both years' production averaged 32,000 bbls. daily, while utilization rose from 26,000 to 27,000 per day. Shipments fell from 3000 to 1000 bbls. daily. Stocks rose during September by 81,937 to a total of 2,771,000 bbls. at the end of the month.

Motor Fuel

September output of commercial gasoline was 158,000 bbls. daily, 17,000 below that of August. Straight-run production was 82,000 bbls. per day, 13,000 below August. Cracked production was off 7000 daily to an average of 49,000 bbls. These declines were partly offset by the 3000-bbl. daily increase in utilization of natural gasoline. Shipments dropped 5000 bbls. below August, to 49,000 daily, and domestic demand was 7000 bbls. below August. These drops brought the September total demand down to 173,000 bbls. daily, a decline of 12,000.

For the first nine months of 1934, California gasoline output averaged 166,000 bbls. per day, 6000 under last year. The entire decline was in straight-run yield which came to 91,000 daily, 11,000 bbls. under 1933. Cracked production went up 3000 bbls. to 48,000 per day, and utilization of natural gasoline was 1000 bbls. daily above 1933, amounting to 27,000 daily. Nine months' shipments this year averaged 47,000 bbls. daily, 15,000 below 1933, but 1934 domestic demand of 124,000 bbls. was 7000 per day more than last year.

During September stocks were reduced by 13,934 bbls. daily, a total 401,934, and amounted to 13,680 bbls. at the close of the month.

Kerosene, Lubricants

Kerosene production decreased from 18,000 to 13,000 bbls. daily and total market demand decreased from 13,000 to 10,000 bbls. daily. Stocks increased 2000 daily, or a total of 59,000, and amounted to 1,349,000 bbls. Sept. 30.

Daily average manufacture of lubricants decreased from 6000 to 4000 bbls. Daily average domestic demand decreased from 5000 to 4000 bbls. Imports decreased from 3000 to 1000 bbls. daily. Stocks decreased 78 bbls. daily, or a total of 2000, and amounted to 857,000 bbls. Sept. 30.

Gas, Diesel and Fuel Oil

Daily average net production of gas oil and Diesel oil decreased from 68,000 to 67,000 bbls. Daily average total market demand decreased from 49,000 to 46,000 bbls. Gas oil used for cracking decreased from 12,674 to 9168 bbls. daily. Stocks increased 15,000 daily and amounted to 5,595,000 bbls. Sept. 30.

Daily average net production of fuel oil increased from 161,000 to 163,000 bbls. Domestic demand decreased from 189,000 to 175,000 bbls. daily and total market demand decreased from 264,000 to 238,000 bbls. daily. Fuel oil used for cracking decreased from 191,000 to 189,000 bbls. daily. Stocks decreased 57,000 daily, a total of 1,718,000 bbls., and amounted to 69,490,000 bbls. Sept. 30.

Liquefied Petroleum Gases

Daily average production of liquefied petroleum gases increased from 770 to 773 bbls. of which 165 was produced at refineries in September. Daily average sales increased from 674 to 757 bbls.

Still gas production during September amounted to 1,473,025 m.c.f., equivalent on a Btu basis to 379,965 bbls. of fuel oil.

Bolsa Out Of Red Ink

Bolsa Chica Oil Corp., for the first time in four years, has emerged from the red ink. Net profit after all charges for the first nine months of 1934 amounted to $5917, which compares with net loss of $25,512 for the first nine months of 1933. Current assets as of Sept. 30, last, totaled $163,392, against $10,931 a year ago, and liabilities were $17,931, against $7552.

Bolsa is drilling a new well, Snow No. 2, at Piru to test a 560-acre lease.

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California Production 443,400 Bbls. Per Day

California crude production averaged 443,400 bbls. daily during the week ended Nov. 3, which, compared with 463,060 bbls. for the preceding 7-day period, represented a drop of 19,660 bbls. The low point of the week was 422,500 bbls. while the five-day average was but 433,600 bbls., which included the final three days of October. The nearly 10,000-bbl. increase in the estimated daily average for the week was the result of wide-open tactics during the first two days of November following the release of shut-in production.

Los Angeles Basin fields—where operators are among the first to reopen their wells—averaged 175,100 daily, against 182,510 for the preceding week. Long Beach was down 1000 bbls. to 53,000 daily, while Santa Fe Springs reported 750 bbls. increase for the week. Huntington Beach was still 5500 bbls. under the average of the preceding week—its total estimated at 34,300 bbls. However, most of the week's decline was confined to northern fields with more than 11,000 bbls. distributed among Kettleman Hills, Midway-Maricopa and the unlisted group.

The week's average, however, was well in line with the new November quota fixed at 462,000 bbls. daily—an increase of 9700 bbls. daily over the October allotment.

Whittier Park Leased

Harry T. Coffin of Los Angeles has obtained from the city of Whittier a drilling lease on part of Woodlawn Park in that city. The operations will be wildcat. The city gets $3000 down, $250 monthly rental until drilling starts, and one-sixth royalty.

National 3 Drilling

Drilling is under way in Wood-Callahan Oil Co.'s National No. 3, in the proven portion of Mountain View. National No. 3 is being drilled south of the company's National No. 1 and No. 2, both producers on a 28-acre lease.

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TRADE & FINANCE

A. L. Weil, president of General Petroleum Corp., recently returned from the East Coast, bringing cheerful news that the West Coast is the white spot of the petroleum industry.

* * *

When K. R. Kingsbury travels abroad, interesting developments may be anticipated in Standard of California's foreign department. Mr. Kingsbury and other company officials are now in London presumably in connection with problems to be ironed out concerning Standard's interests in Bahrein Islands where right of concessions was questioned some time ago.

* * *

Oil Administrator Ickes believes conditions in the oil industry to be "infinitely better." Two companies substantiate this view. Standard of New Jersey declared an extra dividend of 25c in addition to the regular semi-annual disbursement of 50c a share. Pacific Western declared a 40c dividend payable Nov. 30 to stock of record Nov. 17. Last year the company paid 25c a share and this makes its second disbursement.

* * *

Oct. 31 marked the passing of the Los Angeles Curb Exchange after a colorful history covering the last six years. The Curb has been merged with the Los Angeles Stock Exchange.

* * *

While Standard of California showed appreciable gains during the year to date with net profit equivalent to $1.01 for the first nine months, compared with net of 45c a share a year ago, talk of "extras" appears to have been premature. Last quarter earnings are usually low, and there is nothing to warrant the belief that the current quarter will show any deviation from this rule.

* * *

Standard's net income for the nine months after all charges aggregated $13,261,441, against $5,873,516 for the similar period of 1933—more than double a year ago, and the regular 25c quarterly dividend declared by the directors is far more reassuring to stockholders than some of the extras which some other industries have given—and then stopped.

* * *

Union Oil of California was the first of the group to indicate that the big oil companies had overcome the depression and were now in the black with encouraging prospects of remaining there—provided the industry is permitted to forge ahead without too much regimentation.

* * *

Shell Union was the third of the major group to cheer stockholders with the glad word that the company was at last out of the red. Out of the last 15 quarterly reports. Shell Union has reported in the black in only three—the last two quarters of 1933 and third quarter this year.

* * *

But with Shell's heavy write-off, it has been apparent that once the company did emerge from the gloom it would stand a good chance—all things being equal—to remain on the up and up. According to the consolidated income report for the September quarter, net profit amounted to $1,488,704, as compared with $4,536,631 a year ago.

For the nine months Shell's net was $550,021, against a loss of $9,568,756 for the similar period last year. Third quar- share on 400,000 shares of $100 par 5½% share on 400,000 shares of $100 par 5½ preferred stock, against which there is an accumulation of unpaid dividends. Allowing only for regular quarterly dividends on the preferred, the balance is equivalent to about 7c a share on the 13,070,625 no par common outstanding.

* * *

Tide Water Associated Oil and subsidiaries report for the September quarter consolidated net profit of $1,904,284 after all charges and taxes, equal, after regular dividends on the preferred, to 17c a share on 5,630,865 shares of no par common. This compares with net profit of $1,247,423 or 5c a share after preferred dividend requirements in the June quarter, and a net profit of $2,464,885 or 26c a share on approximately the same number of shares in the third quarter last year.

* * *

Tide Water Associated's nine months net profit this year amounted to $4,582,669, equal to 31c a share on the common after regular preferred dividend requirements, against a net profit of $2,639,239 or $3.96 a share on 666,524 shares of 6% preferred in the first nine months of 1933.

* * *

Associated Oil Co., Pacific Coast operating subsidiary of Tide Water Associated, and subsidiaries report for the quarter ended Sept. 30, a net profit of $691,619 after all charges and taxes, equal to 30c a share on 2,290,412 shares of capital stock outstanding. This compares with net profit of $27,747 or 1c a share for the June quarter and a net profit of $873,462 or 38c a share for the September quarter of 1933. For the nine months, a net profit of $1,437,574 or 63c a share was reported, against $1,402,548 or 61c in the same period of 1933.

* * *

Associated's sales for the third quarter increased $1,571,000 or 18..8% over the second quarter, while operating expenses jumped but 10.4%. Seasonal gains in motor traffic helped boost sales which have been steadily climbing for some time.

* * *

Pacific Western Oil Corp., another Pacific Coast unit largely interested in Tide Water Associated, rolled up net profit for the first nine months of $483,959 after all charges and taxes, equivalent to 48c a share on the 1,000,000 shares of capital stock outstanding. This compares with a loss of $174,664 for the similar period last year. —E. R. H.

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Jas. E. Babcock,

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Natural Gas Deposits Of California Just Beginning To Get Development

California's first commercial natural gas came from the famous "courthouse" well at Stockton beweetn 1854 and 1859, antedating oil development by 20 years. It was non-petroleum or "marsh" gas. More wells were drilled successfully at Stockton and at Sacramento and the gas was used commercially until displaced a few years ago by Kettleman North Dome gas.

Gas has been discovered at numerous other Northern California points, although utilized only locally on a small scale in Humboldt, Lake and Tehama counties. However, these discoveries by the drill, and extensive geological studies, have convinced many competent judges that large commercial deposits of gas, some perhaps petroleum gas, other the dry variety, will be developed in the Sacramento Valley, Northern California, as well as elsewhere in the state, whenever demand justifies large capital investment in development. So far only at Buttonwillow, Kern county, has dry gas been developed on a commercial scale. This field has been shut in as a future reserve.

Of commercially utilized natural gas to date, 95% has come from oil wells. Since the first statistics were compiled in 1888, its value has totaled $234,308,717.

Southern California domestic and industrial consumers have used natural gas for the last 20 years from oil wells in Los Angeles Basin, Kern and Ventura counties on a constantly growing scale. Since the opening of Kettleman North Dome, part of its huge gas deposits have come south and natural gas is now supplied for the first time in San Diego and vicinity, to the Mexican line. Since Kettleman came in, pipe line connection has also been established with the San Francisco Bay region and the Sacramento Valley.

Extension of gas utilization has fallen far from expectations, because completion of the Kettleman pipe lines north and south alike was almost immediately followed by the depression. However, the great activity shown by five of the larger oil companies in seeking and developing new sources of supply clearly indicates the anticipation of greatly enhanced future demand.

Besides fuel, natural carbon dioxide gas has been developed in the Imperial Valley near the famous Salton Sea, and dry ice is being manufactured on a small but commercial scale and is being marketed locally and in Arizona. Some hopes are entertained that other valuable gases may yet be found at several California points.

The appended table shows the production and utilization of natural gas in California since 1929:

Year	MCF	Value
1929	400,129,201	$ 29,675,546
1930	315,513,952	24,559,840
1931	344,959,920	16,690,695
1932	284,168,872	16,272,061
1933	271,743,544	15,403,514
Total	1,616,515,489	$102,601,656

Casinghead Gasoline

During the first eight months of 1933 and 1934, California produced approximately 35% of all the casinghead (natural) gasoline extracted from gas in the United States. Here is the record of the three leading states, according to the U. S. Bureau of Mines:

States	1934	1933
	Thousands of Gallons	
California	328,200	327,000
Texas	292,100	236,100
Oklahoma	235,000	233,500

During 1931 and 1932, the State Division of Mines estimates the value of California casinghead gasoline at $31,254,688 and $23,630,291 respectively.

Deane Wants Lease Drilled

Deane Oil Co. of Santa Barbara—Chas. W. Deane, Benjamin Newhall and Helen F. Deane—is negotiating for a well to be drilled on a 60-acre lease, sec. 19, 9-30, six miles from Santa Maria.

Lompoc Well To Start

York-Smullin Oil Co. will start a second well at Lompoc. Foundation for the derrick was poured last week.

Hogan Starts Symons 1

Hogan Petroleum Co. will drill another well to be known as Symons No. 1 at the south end of Mountain View. Rigging up will be under way this week.

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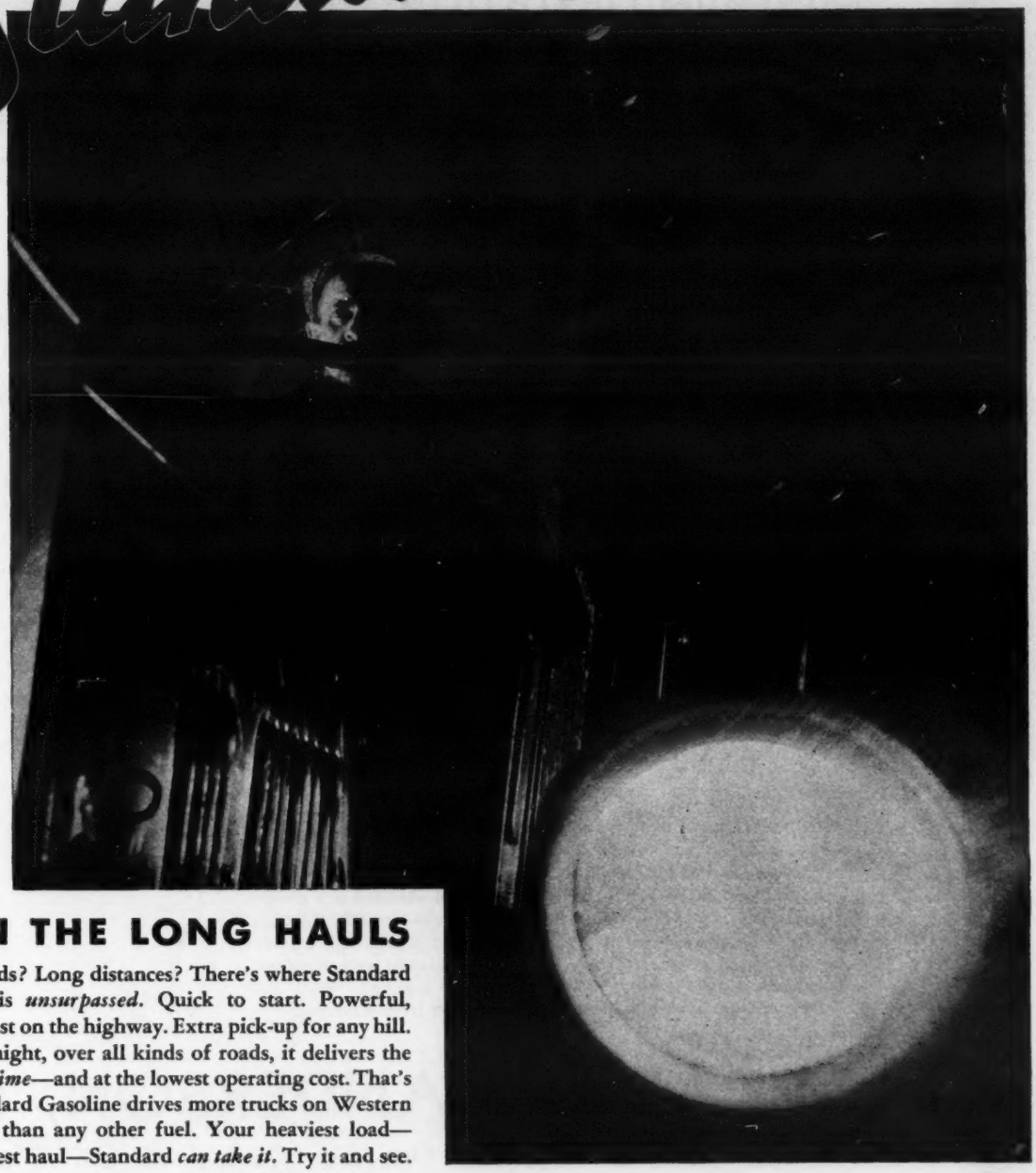

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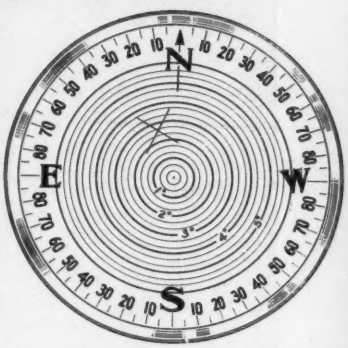

Here is shown our new 5° Record Disc. Note how open and easily read the inclination degree circles are. This Disc has been developed for the special purpose of keeping accurate track of inclination and direction of wells being drilled near to vertical. The reading on this completed disc shows an inclination of 2° 35′ in a direction N 21° E.
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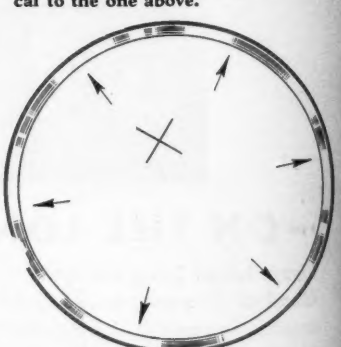

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